
Page 6
Atari Users Magazine
Issue 19
90p
New
MACHINE LANGUAGE game
ST SECTION
5 PAGES!
Build your
own speech
synthesiser
SNOWFALL THE CHASE MAGFILE SECTOR 10 SNOWFALL THE CHASE MAGFILE SECTOR
FRACTALUS SUMMER GAMES CHOP SUEY FRACTALUS SUMMER GAMES CHOP
DISPLAY LISTS SPEECH SYNTHESIS FIRST DISPLAY LISTS SPEECH SYNTHESIS FIRST 5
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10
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FOR PAGE 6 MAGAZINE
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BY D.K. MARSHALL
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PAGE 6 is a user's magazine and relies entirely on readers' support in submitting articles and programs. The aim is to explore ATARI computing through the exchange of information and knowledge. We will endeavour to pay for articles and programs where appropriate and we hope that you will gain satisfaction from seeing your work published. In turn we hope that you will learn from articles submitted by other readers. All published material is eligible for awards in the Annual Readers' Poll and may receive additional Editorial awards as announced from time to time in the magazine.

LISTINGS

ST SECTION

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REVIEWS

FEATURES

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Please make cheques payable to PAGE 6.

Copy date for the next issue is 20th January. Publication date is 1st March 1986

Editorial

NEW MODELS?

Imagine you go the the Motor Show and see the car of your dreams the Ferraro Dini GLX Turbo and a few months later read the Sunday supplements saying 'at your dealer now'. You rush down, order a metallic blue custom painted model, pay your money and bring back the brochures knowing that in a few days time you will be the proud owner of the best car on the block. A few days later, you hear the purr of an engine outside and look out to see a superb metallic blue *standard family saloon*. 'Where's the turbo?' you cry. 'Ah' says the salesman 'it is not quite ready yet, we will fit it later if you bring the car back'. 'What about the quadrophonic cassette?' you ask. 'well we could give you one later, but it has got a radio' says the salesman. And so it goes on. The final straw comes when the salesman says 'Never mind about this one though, sir, why not come down the showroom and see the new *super* turbo?'.

If that story were true you would just tell the salesman what he could do with his car and go to the Lambrini dealer next door and get what you want. But suppose it was a computer, you wouldn't bat an eyelid, would you?

Atari has just announced a 1040ST to be shown at Comdex in Las Vegas at the end of November, along with 'several other new ST products' yet at the time of writing *you can't even buy the 520ST package in the format promised and advertised*. What you get is GEM/TOS and Logo, that's all. No GEMWrite, no GEM-Paint, no BOS. They will all come but isn't it just a bit galling to be reading about a new bigger memory computer when what you would really like is the rest of software you were promised when you bought your current machine? Admittedly many of the problems are outside Atari's control and they are now doing their best to provide substitute programs but it would have been better for all concerned if they had allowed the 520ST to become established before announcing a machine that many people will consider makes the 520ST 'out of date'.

The reason for such announcements is of course pure hype. Jack Tramiel needs to show the media men and his competitors that Atari is way ahead in all fields of personal computing and today's way is to announce something NEW. These products are not for the likes of you and me but for the publicity. Maybe one day they will be available but in the meantime let's hope Atari get down to establishing the 520ST as the computer of today by getting the software out and selling the machine in sufficient quantities to encourage the software houses to complete and release their packages.

ANOTHER YEAR

This issue marks the start of a new year and we wish all our readers success and prosperity in the coming year. 1986 is going to be one of the most exciting years for Atari so far as many users take the exciting step into 16-bits and many others explore new things on their 8-bit machines. The price of the 130XE and the 1050 disk drive is now lower than ever. Many new users will appear and many more will buy their first disk drive. I hope all of you find that PAGE 6 features something to interest you over the next six issues. Even if you are out of work and can't afford all the latest software you can still get immense fulfilment from your Atari by learning to program or by typing in the programs from PAGE 6 which are practically free.

Even though we may criticise from time to time, we still support Atari 100% in both the 16-bit and 8-bit fields. Believe it or not the success of the ST will determine the ongoing success of the 130XE as software houses recognise that Atari will be the name to support in 1986.

Enjoy PAGE 6 in '86. Enjoy Atari!

Leo Elleigh

News

NEW ATARI RECORDER

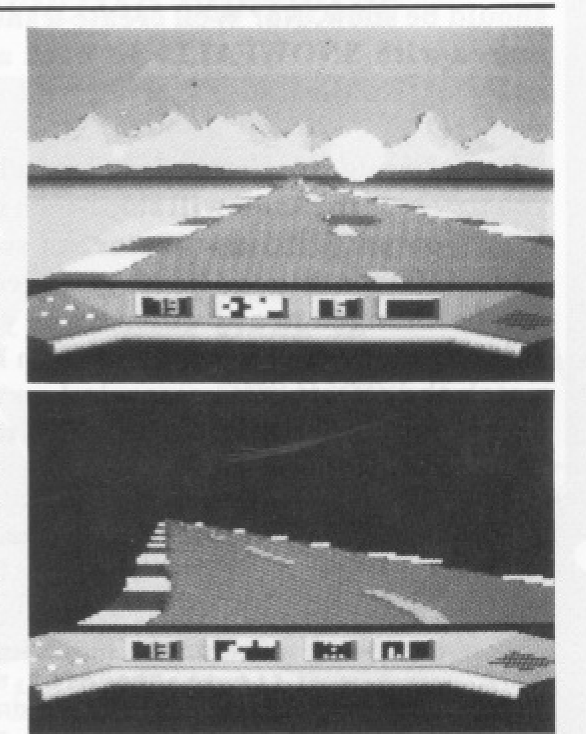
Rumours that Atari are leaving the 8-bit field are " definitely not true" according to Les Player of Atari UK. The company remain fully committed to the the 8-bit machines and to demonstrate that committment have released a new program recorder for the 800XL/130XE. The new unit is the first peripheral not to require a seperate power pack as it draws power from the Serial I/O port of the computer.

Any owners who are looking for a replacement for the 1010 should contact their dealer now for price and availability.

MID PRICE TITLES FROM ARIOLASOFT

Ariolasoft have just released the first in their mid-price series for the Atari. All titles will retail at £9.95 on disk or £7.95 on cassette. D-Bug is an action strategy game set inside a computer in which you must discover and fix a fault in your computer before continuing with an interrupted game. Axis Assassin is an arcade game of 'kill or be killed' arachnids (spiders) with lots of fast action. To follow will be Kaiser which is a simulation in which you control a small German province with the political ambition of becoming Kaiser of Germany.

ELEKTRAGLIDE



English Software are very excited about their new Atari program Elektraglide which they claim has 'features never, repeat never, seen before on a home computer racing game'. Basically a futuristic Pole Position it features junctions where the track splits in two, curved and straight tunnels, high speed 3-D hazards, perspective scrolling landscapes and steering sensitivity options.

Atari versions require 48k and cost £8.95 for cassette or £12.95 on disk.

The screen shots certainly look impressive.

SLOW WORD PROCESSORS PAY MORE!

If you have been deliberating over Superscript (reviewed in issue 17) you may have waited too long! Our review praised the program highly and now the program has been sold to MicroPro who produce the world famous Wordstar. They evidently were impressed by Superscript's capabilities and will now market it in the U.K. under the banner 'from the makers of Wordstar'. Trouble is the price has gone up to £79.95 but it is still a program well worth considering even though equivalent imported American word processors are cheaper.

FREE POSTERS AND Á NEW ADVENTURE SYSTEM

Level 9 have recently released their latest graphic adventure for the Atari and to celebrate are offering FREE posters to anyone who sends a LARGE stamped addressed envelope to Level 9, 'The Worm In Paradise Poster', P.O.Box 39, Weston Super Mare, Avon, BS24 9UR. You don't have to buy the game and the offer is also open to overseas readers who should enclose International Reply Coupons.

The adventure is, of course, The Worm In Paradise, the 3rd part in the Silicon Dream trilogy but the first LEVEL 9 adventure written with their newly developed Adventure system. This will allow Level 9 to improve their adventures - already of a very high standard - even further. Improved text compression techniques allow ordinary English text to be compressed to half its size. Vocabulary is now in excess of 1000 words with an advanced parser which can understand a range of commands and it has multi-tasking. Using separate routines to handle keyboard input, run the game and draw the pictures the program allows players to 'type ahead' whilst the pictures are drawn.

The Worm In Paradise is available now at the usual price of £9.95

DIGITAL INTEGRATION SUPPORTS ATARI

The U.K. software support for Atari continues with Digital Integration releasing their first Atari program, Fighter Pilot. Digital Integration was founded by Dave Marshall and Rod Swift who worked with the Royal Aircraft Establishment and transferred their skills to producing flight simulations for micros. They now have four in-house programmers on of whom is a long time dedicated Atari enthusiast so we can hope to see more programs for the Atari in future.

ST news on page 13

SNOWFALL

by

Fred Key

Look out of the window. It's Christmas and there should be snow. No? Well create a snow scene on your screen with SNOWFALL. Sit back and watch as the snow settles then stop the fall and watch as a thaw sets in!

Type in and run listing 1 and watch the snow fall. If you press 'T' the snow will stop and a slow thaw will set in. If you press 'S' it will start to snow again. Lines 1000 - 1100 contain the house and bird table scene and can be changed to any other scene you wish.

If you make the changes shown in Listing 2 you can watch the effects of a cross wind on the falling snow. Note that this listing must be added to Listing 1, it will not run on its own.

```
CS 1 REM ################################
HU 2 REM #     SNOWFALL - by Fred Key    #
SE 3 REM # ----------------------------- #
XB 4 REM #  PAGE 6 MAGAZINE - ENGLAND    #
CW 5 REM ################################
XI 10 DIM FL(14,1):GRAPHICS 5+16
NC 15 SETCOLOR 4,8,4:SETCOLOR 0,0,14:SETC
   OLOR 1,12,8:SETCOLOR 2,3,8
ME 20 GOSUB 1000
KG 30 GOSUB 2000:FLC=0:K=1
AS 35 COLOR 1:FOR I=0 TO 14:FL(I,1)=FL(I,
   1)-47:NEXT I
XZ 40 FOR I=0 TO 14:IF FL(I,1)<0 THEN FL(
   I,1)=FL(I,1)+1:GOTO 100
YF 50 LOCATE FL(I,0),FL(I,1)+1,X
EN 60 IF X=0 THEN 80
ZJ 70 GOSUB 300:FL(I,1)=0:FL(I,0)=INT((RN
   D(0)*78)+1):IF PEEK(764)=45 THEN FL(I,
   1)=-47:FLC=FLC+1:GOTO 100
US 75 GOTO 90
DF 80 COLOR 0:PLOT FL(I,0),FL(I,1):FL(I,1
   )=FL(I,1)+1
BZ 90 COLOR 1:PLOT FL(I,0),FL(I,1)
TJ 100 NEXT I:POKE 77,0:IF FLC=15 THEN 12
   0
QI 110 GOTO 40
CB 120 POKE 764,255:GOSUB 2000
SY 140 FOR I=0 TO 14
JW 145 IF FL(I,1)=47 THEN GOSUB 500
MN 150 LOCATE FL(I,0),FL(I,1),Z:IF Z=0 TH
   EN 190
WK 160 IF Z<>1 THEN 180
WA 170 COLOR 0:PLOT FL(I,0),FL(I,1)
SW 175 GOSUB 400
GU 180 FL(I,1)=0:FL(I,0)=INT(RND(0)*80):G
   OTO 200
BU 190 FL(I,1)=FL(I,1)+1
LO 200 NEXT I:POKE 77,0:IF PEEK(764)<>62
   THEN 140
WD 210 POKE 764,255:GOTO 30
RY 300 TRAP 350:LOCATE FL(I,0)-1,FL(I,1)+
   1,X:LOCATE FL(I,0)+1,FL(I,1)+1,Y
BM 310 IF X<>0 AND Y<>0 THEN RETURN
VS 320 COLOR 0:PLOT FL(I,0),FL(I,1)
FL 330 J=1:IF X=0 THEN J=-1
CT 340 COLOR 1:FL(I,0)=FL(I,0)+J:FL(I,1)=
   FL(I,1)+1:POP :GOTO 90
ZN 350 PLOT FL(I,0),FL(I,1):RETURN
AL 400 TRAP 450:LOCATE FL(I,0)-1,FL(I,1)-
   1,X:LOCATE FL(I,0)+1,FL(I,1)-1,Y
CJ 410 IF X=0 AND Y=0 THEN RETURN
LL 430 IF X=1 THEN J=-1:GOTO 440
IF 435 IF Y=1 THEN J=1:GOTO 440
ZY 436 RETURN
CY 440 FL(I,0)=FL(I,0)+J:FL(I,1)=FL(I,1)-
   2:POP :GOTO 200
ZK 450 RETURN
KU 500 K=-K:TRAP 550
QU 510 LOCATE FL(I,0)+K,46,X
BO 520 IF X=0 THEN FL(I,0)=FL(I,0)+K:GOTO
    510
IW 530 IF X<>1 THEN POP :GOTO 180
AZ 540 FL(I,0)=FL(I,0)+K:FL(I,1)=46:RETUR
   N
OA 550 POP :GOTO 180
UH 1000 COLOR 1:PLOT 0,47:DRAWTO 79,47
RH 1010 COLOR 2:PLOT 10,25:DRAWTO 20,25
MO 1020 PLOT 15,26:DRAWTO 15,47
BK 1030 COLOR 3:J=70:FOR I=10 TO 20:PLOT
   J,I:DRAWTO 79,I:J=J-1.5:NEXT I
IO 1040 FOR I=19 TO 47:PLOT 60,I:DRAWTO 7
   9,I:NEXT I
AB 1100 RETURN
FA 2000 FOR I=0 TO 14
AO 2010 FL(I,0)=INT(RND(0)*80):FL(I,1)=IN
   T(RND(0)*47)
DB 2020 LOCATE FL(I,0),FL(I,1),X:IF X<>0
   THEN 2010
GH 2030 NEXT I:RETURN
```

```
CS 1 REM ################################
HC 2 REM # SNOWFALL 2  with cross wind #
PD 3 REM #    add lines to Listing 1   #
CV 4 REM ################################
YQ 50 TRAP 80:LOCATE FL(I,0)+1,FL(I,1)+1,
   Z
FB 60 IF Z=0 THEN 80
TD 70 GOSUB 300:FL(I,1)=0:IF PEEK(764)=45
    THEN FL(I,1)=-47:FLC=FLC+1:GOTO 100
KT 75 Y=INT(RND(0)*46):X=INT(RND(0)*76):Z
   =INT(RND(0)*3+1):ON Z GOTO 76,77,76
TL 76 FL(I,0)=X:FL(I,1)=0:GOTO 90
JT 77 FL(I,0)=0:FL(I,1)=Y:GOTO 90
PW 80 COLOR 0:PLOT FL(I,0),FL(I,1):FL(I,0
   )=FL(I,0)+1:FL(I,1)=FL(I,1)+1
OS 90 TRAP 75:COLOR 1:PLOT FL(I,0),FL(I,1
   )
HN 150 TRAP 190:LOCATE FL(I,0),FL(I,1),Z:
   IF Z=0 THEN 190
XF 300 TRAP 350:LOCATE FL(I,0),FL(I,1)+1,
   X:LOCATE FL(I,0)+2,FL(I,1)+1,Y
FJ 320 J=1:IF X=0 THEN J=-1
VU 330 COLOR 0:PLOT FL(I,0),FL(I,1)
TU 340 COLOR 1:FL(I,0)=FL(I,0)+1+J:FL(I,1
   )=FL(I,1)+1:POP :GOTO 90
ZJ 350 RETURN
FB 440 FL(I,0)=FL(I,0)+J:FL(I,1)=FL(I,1)-
   10:POP :GOTO 200
BA 540 FL(I,0)=FL(I,0)+K:FL(I,1)=37:RETUR
   N
```



by Nigel Llewellyn

For those of you who enjoy more sedate or traditional games or who would like a good family game for up to four players, here is THE CHASE.

The game is based on the popular board game of 'Ludo' and each player has four counters of one colour and must release them from 'Base' onto the starting square of their own colour. The counters are then moved around the play area to arrive at 'Home' (Headquarters). The first player to move all his counters into Headquarters is the winner. As with Ludo, if you land on a square which is already occupied by an opponent, you capture that square and your opponent's counter must be returned to Base. The game differs from Ludo in that only one counter can occupy any square so that if you are unlucky enough to land on a square already occupied by one of your own counters, you will capture your own counter thus returning it to Base.

More detailed instructions are included in the program and prompts are shown on screen throughout the game. No joysticks are required.

```
EI 1 REM ********************************
ZC 2 REM **          THE CHASE         **
IO 3 REM **             by             **
TG 4 REM **      NIGEL LLEWELLYN       **
ZA 5 REM ** -------------------------- **
ZX 6 REM ** PAGE 6 MAGAZINE - ENGLAND **
EO 7 REM ********************************
NN 8 REM
BJ 10 OPEN #1,4,0,"K:"
BE 20 POKE 559,0:GOSUB 1000:GOSUB 800:POK
   E 559,34
QX 30 GOSUB 800
ZP 40 PL=-1
EV 49 REM ** CHOOSE PLAYER **
WG 50 PL=PL+1:IF PL>PLAYERS THEN PL=0
AO 51 F=PL+1:POSITION 3,0:ON F GOTO 52,53
   ,54,55
XX 52 ? #6;" blue to play":GOTO 56
CX 53 ? #6;" red to play ":GOTO 56
MA 54 ? #6;"WHITE TO PLAY":GOTO 56
BI 55 ? #6;"GREEN TO PLAY"
RQ 56 POSITION 0,20:? #6;"     PRESS
   TO         ROLL DICE        ":COLOR 0:PLO
   T 12,23:POKE 53248,0
WV 57 FOR I=1 TO 3:SOUND 0,63,10,8:POSITI
   ON 9,20:? #6;"     ":FOR D=1 TO 50:NEX
   T D
KH 58 SOUND 0,126,10,8:POSITION 9,20:? #6
   ;"START":FOR D=1 TO 50:NEXT D:NEXT I:S
   OUND 0,0,0,0
RG 59 IF PEEK(53279)<>6 THEN 59
RJ 60 POSITION 0,20:? #6;"
                           ":POKE 53248,144
SO 69 REM ** ROLL DICE ROUTINE **
QV 70 DICE=INT(RND(0)*6)+1:DICE1=DICE
YN 71 FOR D=0 TO 50:SOUND 0,50+D,10,10
JT 72 N=INT(RND(0)*6)+33
JZ 73 COLOR N:PLOT 12,23:SOUND 0,0,0,0
OT 74 FOR X=0 TO 2:NEXT X:NEXT D
PU 75 COLOR DICE+32:PLOT 12,23:POKE 77,0:
   POKE 764,255
IT 99 REM ** BEGIN TURN **
MJ 100 IF DICE=6 AND BASE(F)+HOME(F)=4 TH
   EN GOTO 500
QY 102 IF DICE=6 AND BASE(F)>0 THEN GOTO
   115
CO 105 IF BASE(F)+HOME(F)<4 THEN GOTO 150
AT 110 POSITION 0,20:? #6;" sorry no coun
   ters          to move":FOR D=0 TO 500:NE
   XT D:GOTO 50
TD 115 POSITION 0,20:? #6;" press M to mo
   ve or R to release counter"
GL 120 GET #1,K
CS 125 IF K=77 AND BASE(F)<4 THEN GOTO 15
   0
WW 130 IF K=82 AND BASE(F)>0 THEN GOTO 50
   0
MX 135 GOTO 120
UV 149 REM ** MOVE COUNTER **
WV 150 POSITION 0,20:? #6;"  WHICH COUNTE
   R DO    YOU WANT TO MOVE    "
HG 155 GET #1,K
WT 160 IF K<49 OR K>52 THEN GOTO 155
ON 165 E=K-48:T=(PL*4)+E
PJ 170 IF AC(T)<>1 THEN GOTO 155
MQ 172 POSITION 0,20:? #6;"
                                  "
RC 175 ON DIR(T) GOTO 180,185,190,195
IB 180 Z(T)=PEEK(CP(T)+1):POKE CP(T),CL(T
   ):CP(T)=CP(T)+1:GOTO 200
OE 185 Z(T)=PEEK(CP(T)-1):POKE CP(T),CL(T
   ):CP(T)=CP(T)-1:GOTO 200
PJ 190 Z(T)=PEEK(CP(T)-20):POKE CP(T),CL(
   T):CP(T)=CP(T)-20:GOTO 200
ZV 195 Z(T)=PEEK(CP(T)+20):POKE CP(T),CL(
   T):CP(T)=CP(T)+20
LO 200 POKE CP(T),CC(T):CL(T)=Z(T)
NT 205 IF Z(T)=13 AND DICE>1 THEN GOTO 32
   0
UQ 210 IF Z(T)=13 THEN GOTO 600
FT 249 REM ** CHECK FOR DIRECTION **
MA 250 IF CP(T)=TL+47 OR CP(T)=TL+161 OR
   CP(T)=TL+171 THEN DIR(T)=1
QE 255 IF CP(T)=TL+247 OR CP(T)=TL+371 OR
   CP(T)=TL+257 THEN DIR(T)=2
RN 260 IF CP(T)=TL+167 OR CP(T)=TL+241 OR
   CP(T)=TL+367 THEN DIR(T)=3
XT 265 IF CP(T)=TL+51 OR CP(T)=TL+177 OR
```

```
   CP(T)=TL+251 THEN DIR(T)=4
WT 270 ON PL+1 GOTO 280,290,300,310
ZK 280 IF CP(T)=TL+203 THEN DIR(T)=1
FO 283 IF CP(T)=TL+243 THEN DIR(T)=3
PM 286 GOTO 350
DK 290 IF CP(T)=TL+215 THEN DIR(T)=2
JU 293 IF CP(T)=TL+175 THEN DIR(T)=4
PO 296 GOTO 350
UQ 300 IF CP(T)=TL+89 THEN DIR(T)=4
PX 303 IF CP(T)=TL+87 THEN DIR(T)=1
OX 306 GOTO 350
IJ 310 IF CP(T)=TL+329 THEN DIR(T)=3
CH 313 IF CP(T)=TL+331 THEN DIR(T)=2
OW 315 GOTO 350
EE 320 ON PL+1 GOTO 325,330,335,340
KA 325 DIR(T)=2:GOTO 350
JB 330 DIR(T)=1:GOTO 350
KO 335 DIR(T)=3:GOTO 350
TK 340 DIR(T)=4
CO 349 REM ** REM CHECK FOR NEXT MOVE **
RP 350 SOUND 2,100,1,10:SOUND 2,0,0,0:FOR
    D=0 TO 100:NEXT D
DR 355 DICE=DICE-1:IF DICE>0 THEN GOTO 17
   5
UN 399 REM ** WHAT HAVE I LANDED ON **
UM 400 FOR I=1 TO 16
KU 405 IF Z(T)=CC(I) THEN POP :GOTO 425
FW 410 NEXT I
MW 415 IF DICE1=6 THEN GOTO 56
QX 420 GOTO 50
FE 425 POKE BP(I),CC(I):CL(T)=CL(I):DIR(I
   )=DIR1(I)
LK 430 B=INT(I/4.2)+1:BASE(B)=BASE(B)+1:A
   C(I)=0
QB 435 GOTO 415
JP 499 REM ** RELEASE A COUNTER **
NL 500 POSITION 0,20:? #6;"WHICH COUNTER
   DO YOU  WANT TO RELEASE   "
HA 505 GET #1,K
VD 510 IF K<49 OR K>52 THEN GOTO 505
OH 515 E=K-48:T=(PL*4)+E
YN 520 IF PEEK(BP(T))=0 THEN GOTO 505
UJ 525 XX=PEEK(SP(T))
AR 530 POKE BP(T),0:POKE SP(T),CC(T):CP(T
   )=SP(T):BASE(F)=BASE(F)-1
JZ 535 AC(T)=1
YA 540 IF T<5 THEN CL(T)=204
SW 545 IF T>4 AND T<9 THEN CL(T)=76
TR 550 IF T>8 AND T<13 THEN CL(T)=12
ZZ 555 IF T>12 THEN CL(T)=140
PL 559 REM *CHECK IF START WAS OCCUPIED*
UZ 560 FOR I=1 TO 16
RC 565 IF XX=CC(I) THEN POP :GOTO 580
GJ 570 NEXT I
SI 575 GOTO 51
WD 580 POKE BP(I),CC(I):AC(I)=0:DIR(I)=DI
   R1(I)
LJ 585 B=INT(I/4.2)+1:BASE(B)=BASE(B)+1
SX 590 GOTO 575
WY 599 REM ** REACH HEAD-QUATERS **
RM 600 FOR H=50 TO 0 STEP -2
ZQ 605 SOUND 0,H,10,10
US 610 POKE TL+209,CC(T)
EX 615 FOR J=0 TO H/2:NEXT J
AZ 620 POKE TL+209,13
EZ 625 FOR J=0 TO H/2:NEXT J
RZ 630 NEXT H:SOUND 0,0,0,0:AC(T)=2
OY 635 HOME(F)=HOME(F)+1:IF HOME(F)=4 THE
   N GOTO 650
PQ 640 GOTO 415
NG 649 REM ** END OF GAME **
OX 650 GRAPHICS 17:POKE 16,64:POKE 53774,
   64:POKE 756,CHSET:POKE 708,12:POKE 709
   ,0:POKE 53248,0
TT 655 FOR I=0 TO 23
DY 660 COLOR 7:PLOT 0,I:DRAWTO 19,I:NEXT
   I
ME 665 ON F GOTO 670,671,672,673
SZ 670 POSITION 3,5:? #6;" BLUE  PLAYER "
   :GOTO 680
WF 671 POSITION 4,5:? #6;" RED PLAYER ":G
   OTO 680
CJ 672 POSITION 3,5:? #6;" WHITE PLAYER "
   :GOTO 680
CF 673 POSITION 3,5:? #6;" GREEN PLAYER "
CR 680 POSITION 8,6:? #6;" IS "
QI 681 POSITION 4,7:? #6;" THE WINNER "
QE 685 POSITION 3,15:? #6;" PRESS ANY KEY
   ":POSITION 6,16:? #6;" TO RUN "
EL 690 X=USR(1664)
HT 695 GET #1,K
UR 700 RUN
EP 799 REM ** DRAW IN DICE **
FV 800 FOR I=512 TO 767:POKE PMB+I,0:NEXT
   I
KE 805 POKE 559,46:POKE 53256,0
IA 810 POKE 53248,0:POKE 704,52
WA 815 FOR I=PMB+512+107 TO PMB+512+107+9
   :POKE I,255:NEXT I
VN 820 POKE 53277,3
SD 899 REM ** DRAW IN PLAY AREA **
IQ 900 ? #6;"K":POKE 756,CHSET
HY 905 POSITION 0,2
HC 910 ? #6;"           ''''' BASE"
KQ 912 ? #6;" b ▛      '   ''"
RU 914 ? #6;" a ▚     **)  ,  ./01"
YU 916 ? #6;" s ▜      ' )  ''"
SA 918 ? #6;" e ▀      ' )  ''"
XA 920 ? #6;"          ' )  ''"
WK 922 ? #6;" ''▟'''' )  ''''.'''"
OQ 924 ? #6;" '        )        .''"
SR 926 ? #6;" ' ◥◥◥◥◥◥-▪▪▪▪▪▪ ''"
JU 928 ? #6;" ' ◤     ▐      ''"
QU 930 ? #6;" ''◤''''' ▐  '''▪'''"
RA 932 ? #6;"          ' ▐  ''"
GM 934 ? #6;"          ' ▐ '   _ b"
GQ 936 ? #6;"          ' ▐ '   . a"
NF 938 ? #6;"   10/. ▙  (++   + s"
LS 940 ? #6;"          '   '   r e"
PD 942 ? #6;"   BASE  ''''''"
LI 944 POSITION 7,23:? #6;"dice◥"
KA 946 POKE DL+28,7
XP 949 REM ** SET VARIABLES **
BN 950 RESTORE 992
YV 955 FOR I=1 TO 16:READ A,B,C,D
YD 960 DIR(I)=A:DIR1(I)=DIR(I):AC(I)=0
DI 965 CC(I)=B:BP(I)=TL+C:SP(I)=TL+D
GN 970 NEXT I
OI 975 FOR I=1 TO 4
JT 980 BASE(I)=4:HOME(I)=0
HE 985 NEXT I
ZX 990 RETURN
PQ 992 DATA 1,206,123,163,1,207,103,163,1
   ,208,83,163,1,209,63,163
GJ 994 DATA 2,78,295,255,2,79,315,255,2,8
   0,335,255,2,81,355,255
HB 996 DATA 4,14,93,91,4,15,94,91,4,16,95
   ,91,4,17,96,91
IF 998 DATA 3,142,325,327,3,143,324,327,3
   ,144,323,327,3,145,322,327
SG 999 REM ** TITLE PAGE **
HW 1000 ? "K":RESTORE 1010:FOR I=0 TO 63:
    READ A
VF 1005 POKE 1664+I,A:NEXT I
VQ 1010 DATA 173,36,2,141,193,6,173,37
NS 1011 DATA 2,141,194,6,160,180,162,6
FT 1012 DATA 169,7,32,92,228,238,192,6
NP 1013 DATA 173,192,6,141,10,212,141
TZ 1014 DATA 23,208,174,252,2,232,240
XN 1015 DATA 238,172,193,6,174,194,6,169
EP 1016 DATA 7,32,92,228,104,96,206,197,2
QC 1017 DATA 173,197,2,141,192,6,76,98,22
    8
LX 1020 FOR I=0 TO 31:READ D:POKE 1536+I,
    D:NEXT I
FN 1025 DATA 104,104,133,204,104,133,203
EL 1026 DATA 169,224,133,206,160,0,132
OP 1027 DATA 205,162,4,177,205,145,203
```

```
TN 1028 DATA 136,208,249,230,204,230,206
UA 1029 DATA 202,208,242,96
FT 1050 GRAPHICS 17:POKE 16,64:POKE 53774
   ,64:POKE 710,144:POKE 712,144
JW 1055 DL=PEEK(560)+PEEK(561)*256
AM 1060 POKE DL+11,2:POKE DL+14,7:POKE DL
   +17,2:POKE DL+20,2:POKE DL+22,2:POKE D
   L+23,2
KL 1065 POSITION 7,2:? #6;"page | "
IQ 1070 POSITION 16,6:? #6;"PRESENTS"
QU 1075 POSITION 5,10:? #6;"the  chase"
EU 1080 POSITION 5,13:? #6;"BY NIGEL LLEW
   ELLYN     (P) 1984":POSITION 8,17:? #6;
   "PRESS I FOR INSTRUCTIONS"
YS 1085 POSITION 7,20:? #6;"HOW MANY PEOP
   LE WILL PLAY?"
YX 1090 POSITION 12,22:? #6;"PRESS KEYS 1
    - 4"
OM 1095 X=USR(1664)
GT 1110 GET #1,K
TH 1113 IF K=73 THEN GOTO 2000
HV 1115 IF K<49 OR K>52 THEN 1095
CJ 1120 GRAPHICS 17:POKE 16,64:POKE 53774
   ,64:POKE 708,10:POKE 709,56:POKE 710,1
   84:POKE 711,120
PD 1125 PLAYERS=K-49:POSITION 0,5:? #6;"N
   UMBER OF PLAYERS ";PLAYERS+1
TU 1130 POSITION 4,10:? #6;"PLEASE WAIT."
   :POSITION 2,15:? #6;"setting up board"
XJ 1149 REM  **** INITIALISE ****
IB 1150 DIM DIR(16),DIR1(16),AC(16),BP(16
   ),CC(16),CP(16),SP(16),Z(16),CL(16)
RR 1155 DIM BASE(4),HOME(4)
HP 1160 POKE 106,PEEK(106)-12:CHSET=PEEK(
   106)+4
IU 1165 TL=PEEK(88)+PEEK(89)*256
RW 1170 PMB=PEEK(106)*256:POKE 54279,PEEK
   (106)
SB 1175 X=USR(1536,CHSET*256)
IA 1195 FOR I=8 TO 143:READ A:POKE CHSET*
   256+I,A
ET 1200 NEXT I
AJ 1220 RETURN
WC 2000 GRAPHICS 0:POKE 16,64:POKE 53774,
   64:POKE 752,1:POKE 709,8:POKE 710,144:
   POKE 712,144
QZ 2002 ? "K       THE CHASE - INSTRUCTIONS
          ":? :? " CAUTION !!! ":? "THESE I
   NSTRUCTIONS WON'T BE AVAILABLE"
RU 2004 ? "DURING THE GAME AND IT MAY BE
   WISE TO":? "MAKE A FEW NOTES!":? :? "
   OBJECT OF THE GAME :FOR EACH PLAYER"
JJ 2006 ? "TO MOVE HIS MEN ONCE AROUND TH
   E PLAY":? "AREA AND BRING THEM SAFELY
   TO HEAD-"
MM 2008 ? "QUARTERS. IN THE COURSE OF THE
    GAME":? "EACH PLAYER TRIES TO CATCH H
   IS"
ZT 2010 ? "OPPONENTS BY SENDING THEM BACK
    TO":? "THEIR 'HOME BASES'.":?
AD 2012 ? " TO BEGIN : ":? "EACH PLAYER CH
   OOSES ONE COLOUR.":? :? "PL. ONE = BLU
   E    PL. THREE = WHITE"
IP 2014 ? "PL. TWO = RED        PL. FOUR =
    GREEN":? :? :? "       PRESS ANY KEY TO
    CONTINUE ":GET #1,K
XA 2016 ? "K       THE CHASE - INSTRUCTION
   S        ":? :? " STARTING THE GAME : ":?
    "PLAYER MUST THROW A 6 BEFORE HE CAN"
TK 2018 ? "MOVE A MAN FROM 'HOME BASE' TO
    THE":? "STARTING SQUARE OF HIS OWN CO
   LOUR."
ZD 2020 ? "EVERY TIME A PLAYER THROWS A 6
    HE IS":? "ENTITLED TO ANOTHER GO. THE
    MEN ARE"
EX 2022 ? "MOVED AS MANY SQUARES AS SHOWN
    ON":? "THE DICE.SQUARES ARE COUNTED W
   HETHER"
IK 2024 ? "THEY ARE EMPTY OR OCCUPIED.":?
   :? " TO CAPTURE AN OPPONENT : THERE A
   RE"
GK 2026 ? "TWO WAYS TO CAPTURE AN OPPONEN
   T :-":? :? "1) BY RELEASING A MAN FROM
    HOME BASE"
MZ 2028 ? "WHEN AN OPPONENT IS OCCUPYING
   YOUR":? "STARTING SQUARE."
UC 2030 ? "2) BY LANDING ON THE SAME SQUA
   RE AS":? "YOUR OPPONENT WITH THE LAST
   MOVE OF":? "YOUR GO."
RY 2032 ? :? "          PRESS ANY KEY TO CONTI
   NUE ":GET #1,K
CA 2034 ? "K       THE CHASE - INSTRUCTION
   S       ":? :? " TO CAPTURE AN OPPONENT
    CONT."
MC 2036 ? "WHEN AN OPPONENT IS CAPTURED H
   E IS":? "AUTOMATICALLY REPLACED IN HIS
    'HOME":? "BASE'.":?
QV 2038 ? " TO ENTER HEAD-QUARTERS : ":? "
   AFTER EACH MAN HAS MOVED ONCE AROUND":
   ? "THE PLAY AREA HE WILL ENTER THE"
FA 2040 ? "FINISHING AREA OF HIS COLOUR.
   THE":? "AREA IS MARKED WITH ARROWS.":?
    "TO ENTER 'HQ' PLAYER MUST THROW THE"
WS 2042 ? "EXACT NUMBER OF MOVES ON THE D
   ICE.":? "IF TOO MANY ARE THROWN THE MA
   N WILL"
JV 2044 ? "MOVE IN AND OUT OF 'HQ' AND MO
   VE":? "TOWARDS THE 'FINISHING CORNER'.
    ONCE"
DZ 2046 ? "HE REACHES THE CORNER HE WILL
   AGAIN":? "BE ALLOWED TO TRY AND ENTER
   'HQ'."
AU 2048 ? :? :? "         PRESS ANY KEY TO CO
   NTINUE ":GET #1,K
EQ 2050 ? "K       THE CHASE - INSTRUCTION
   S       ":? :? " THE WINNER : ":? "THE F
   IRST PLAYER WHO MOVES ALL HIS"
RW 2052 ? "MEN INTO HEAD-QUARTERS IS THE
   WINNER.":?
AF 2054 ? :? "┌──────── WARNING !!! ─
   ───────┐":? "| BE ALERT WHEN YOU MOV
   E YOUR MEN,   |"
FL 2056 ? "| BECAUSE ONLY ONE MAN CAN OCC
   UPY A |":? "| SQUARE.  SO IF YOU LAND O
   N ONE OF   |"
ZH 2058 ? "| YOUR OWN MEN HE WILL BE SENT
    BACK |":? "| TO YOUR 'HOME BASE'.
     |"
IH 2060 ? "└─────────────────────
   ─────┘":? :? "    ALL PROMPTS ARE GIVE
   N ON SCREEN"
AZ 2070 ? :?"       PRESS ANY KEY TO
   ":? "        RETURN TO TITLE PAGE ":GE
   T #1,K
QA 2080 GOTO 1050
WF 3052 REM ** DATA FOR CHARACTERS **
CQ 3055 DATA 0,0,0,24,24,0,0,0
BP 3057 DATA 0,6,6,0,0,96,96,0
OX 3059 DATA 6,6,0,24,24,0,96,96
AF 3061 DATA 0,102,102,0,0,102,102,0
HZ 3063 DATA 102,102,0,24,24,0,102,102
HJ 3065 DATA 102,102,0,102,102,0,102,102
NP 3067 DATA 0,170,84,170,84,170,84,170
PD 3069 DATA 0,16,56,124,254,56,56,56
JI 3071 DATA 0,56,56,56,254,124,56,16
MN 3073 DATA 0,16,24,252,254,252,24,16
YJ 3075 DATA 0,16,48,126,254,126,48,16
VJ 3097 DATA 0,254,198,222,198,246,198,25
   4
KS 3099 DATA 0,0,174,170,234,170,174,2
LT 3101 DATA 0,254,238,238,238,238,238,25
   4
XB 3103 DATA 0,254,194,250,226,222,194,25
   4
CK 3105 DATA 0,254,194,250,194,250,194,25
   4
UY 3107 DATA 0,254,222,222,214,194,246,25
   4
```
□

1020 printer

80 COLUMNS WITHOUT FUSS

In issue 13 we published a 1020 handler device for producing listings in 80 columns. The listing would not work on the XL or XE models and several reader's have asked for a cassette version. Here then is a simple solution submitted by Jeff Best.

Simply type the following line in direct mode with the program you wish to list in memory.

```
OPEN #1,8,0,"P:":? #1;"Ɛ+":POKE 181,1:
LIST:CLOSE #1
```

If you prefer you can save this with a line number of (say) 32000 and LIST it to disk or cassette. Then simply ENTER it with your program in memory and type GOTO 32000.

UPDATE

As this issue was prepared before issue 18 went out we don't know of any problems with the listings but we are sure there won't be any(!).

One apology though, we wrongly credited LISTER on page 58 to Mary Lynch when in fact it was written by Linda Tinkler. Sorry Linda.

£100 REWARD

for information leading to the prosecution of any person or persons responsible for distributing unauthorised copies of 80 COLUMN Pack or other Computer Support products.

Upon prosecution of the person(s) concerned the reward of £100 plus a free original copy of Ultimon will be given to the person providing the information.

All replies treated in the strictest confidence. Your name will not be disclosed.

Please phone John Lawson at Computer Support on 01 311 7339.

ADVENTURE

Due to circumstances beyond our control, as they say, we cannot run the Adventure column by Garry Francis this issue. For the past 18 months disks have been flying back and forth across the world and it is a miracle that things have gone so smoothly. For the first time we did not receive Garry's column by the copy date for this issue and we are unable to give adventure fans their regular fix! Let's hope that Garry will be back soon.

In the meantime why not take this oppurtunity to drop Garry a line and let him know what you would like to see in future columns. Send your ideas, suggestions or comments to Garry Francis, Atari Computer Enthusiasts (N.S.W.), Adventure S.I.G., G.P.O.Box 4514, Sydney, N.S.W., Australia 2001

How to Type in the Listings and get them right!

The program listings in PAGE 6 are prepared carefully to ensure that they can be typed in as easily as possible. Before typing any listings ensure that you are familiar with the use of the Shift and CONTROL and INVERSE keys as outlined in your computer manual. The listings are prepared to match exactly what you see on screen. Every character that you may see in a listing is included in the chart below for cross reference. By using TYPO 3 you can ensure that you type in the programs EXACTLY as they are printed. Remember a single typing mistake may mean a program will not run.

WHAT ARE THOSE CODES?

Each line of a program begins with a special two letter code. THESE SHOULD NOT BE TYPED IN. They are used by the program TYPO to check that you have typed each line correctly. IF YOU HAVE NOT ALREADY TYPED IN THE TYPO 3 LISTING PLEASE DO SO NOW. The program can be used as you type in each line of a program or to check an already typed program. The code for each line will match but if you have problems check the listing conventions below carefully, you are most probably typing a CONTROL character incorrectly. TYPO 3 cannot check if a line has been missed so if you have problems in running a listing count the lines in the program and ensure none are missing. If the TYPO codes match and the program still does not run, LIST it to cassette or disk using LIST "C:" or LIST "D:filename", switch off the computer, re-boot and then ENTER the program using ENTER "C:" or ENTER "D:filename". Save this version in the normal way.

HOW TO USE TYPO 3

1. Type in the listing carefully for although you can use TYPO 3 to check itself (see 6 below) it may not work if you have made mistakes.

2. SAVE or CSAVE a copy of the program.

3. Each time you want to type in a program listing RUN TYPO 3 *first*. The program will install a machine code routine in memory and then delete itself. Now type in a line as shown in the magazine *excluding the first two letter code* and press RETURN.

4. A two letter code will appear at the top left of your screen. If this code matches the one in the magazine carry on and type the next line. Note, the code will not match if you use abbreviations. If you prefer to use abbreviations LIST the line you have just typed, move the cursor to that line and press RETURN. The code should now match.

5. If the code does not match, use the editing keys to correct the line and press RETURN again. Repeat if necessary until the codes match.

6. To check a line you have already typed LIST the line, place the cursor on that line and press RETURN.

7. When you have finished a listing just SAVE or CSAVE it in the normal way.

You can type in a program without using TYPO 3 and then check it by SAVEing or CSAVEing a copy of the program, running TYPO 3 and then LOADing or CLOADing your program and proceeding as in step 6 above.

Always SAVE or CSAVE a program before running it and always use TYPO before telling us that a program will not run.

```
EI 1 REM ********************************
AL 2 REM *  TYPO III by Alec Benson     *
         *          June 1985           *
SA 3 REM * A proofreader for ANTIC and *
         *   PAGE 6 based on TYPO II    *
         * published by ANTIC magazine *
EL 4 REM ********************************
SG 100 GRAPHICS 0
WG 110 FOR I=1536 TO 1791:READ A:CK=CK+A:
   POKE I,A:NEXT I
CG 120 IF CK<>30765 THEN ? "Error in DATA
    statements - Check Typing":END
YM 130 A=USR(1536)
VT 140 ? :? "TYPO III is up and running":
   NEW
MA 1000 DATA 104,160,0,185,26,3,201,69
MG 1010 DATA 240,8,200,200,200,192,36,208
OB 1020 DATA 242,96,200,169,79,153,26,3
RK 1030 DATA 200,169,6,153,26,3,162,0
RR 1040 DATA 189,0,228,157,79,6,232,224
TO 1050 DATA 15,208,245,169,93,141,83,6
KC 1060 DATA 169,6,141,84,6,173,4,228
EU 1070 DATA 105,0,141,95,6,173,5,228
BK 1080 DATA 105,0,141,96,6,169,0,162
KK 1090 DATA 3,149,203,202,16,251,96,0
ZR 1100 DATA 0,0,0,0,0,0,0,0
LD 1110 DATA 0,0,0,0,0,0,32,94
JM 1120 DATA 6,8,72,201,155,240,55,230
TV 1130 DATA 203,133,209,138,72,169,0,133
TW 1140 DATA 208,162,8,10,38,208,6,209
MF 1150 DATA 144,7,24,101,203,144,2,230
RL 1160 DATA 208,202,208,239,133,207,24,1
   65
TM 1170 DATA 204,101,207,133,204,165,205,
   101
AW 1180 DATA 208,133,205,165,206,105,0,13
   3
XM 1190 DATA 206,104,170,104,40,96,138,72
NR 1200 DATA 152,72,162,0,134,207,134,208
GF 1210 DATA 160,24,6,204,38,205,38,206
EA 1220 DATA 38,207,38,208,56,165,207,233
TM 1230 DATA 164,170,165,208,233,2,144,4
SK 1240 DATA 134,207,133,208,136,208,227,
   162
CB 1250 DATA 8,165,207,133,204,165,208,6
XN 1260 DATA 204,42,201,26,144,4,233,26
MB 1270 DATA 230,204,202,208,242,133,205,
   169
BC 1280 DATA 128,145,88,200,192,40,208,24
   9
WV 1290 DATA 165,204,105,160,160,3,145,88
QA 1300 DATA 165,205,24,105,161,200,145,8
   8
MQ 1310 DATA 32,69,6,104,160,76,153,6
```

Lower case	Inverse lower	Upper case or Shift	Inverse Upper or Shift	CTRL	Inverse CTRL
1		!			
2		"			
3		#			
4		$			
5		%			
6		&			
7		'			
8		@			
9		(			
0		)			
<					
>					
a		A			
b		B			
c		C			
d		D			
e		E			
f		F		/	
g		G		\	
h		H			
i		I			
j		J			
k		K			
l		L			
m		M			
n		N			
o		O			
p		P			
q		Q			
r		R			
s		S		+	
t		T			
u		U			
v		V			
w		W			
x		X			
y		Y			
z		Z			
-		_			
=		|			
;		:			
+		\			
*		^			
,		[			
.		]			
/		?			

ESC ESC
ESC CTRL -
ESC CTRL =
ESC CTRL +
ESC CTRL *
ESC SHIFT CLEAR
ESC DELETE
ESC TAB
ESC SHIFT DELETE
ESC SHIFT INSERT
ESC CTRL TAB
ESC SHIFT TAB
ESC CTRL 2
ESC CTRL DELETE
ESC CTRL INSERT

■ INVERSE SPACE

SOFTWARE UPDATE

Early purchasers of the 520ST should now have a disk based version of BASIC. The disk and manuals were sent out to distributors in mid-November and may be collected from your dealer free of charge. The disk includes STWRITER as an alternative (though not a substitute) for GemWrite.

Atari say that Digital Research has promised GemWrite and GemPaint 'during November' but it will still be necessary for Atari to complete the manuals for these products. Atari cannot act until the finished products are received but some progress should be evident by the time you read this.

The final decision on the form in which BOS will be available has not yet been taken but it is likely that Atari will issue a voucher which interested users can take to their local BOS dealer for a free copy of BOS. It should be stressed that BOS on its own is worthless so it is only worth obtaining a copy if you intend to purchase BOS based applications.

TOS ON ROM

Although there have been delays, GEM/TOS should now be available on ROM. The upgrade is available from your dealer/ distributor by returning the keyboard unit which will be upgraded for a 'nominal' fee of £25. Silica Shop will however provide the upgrade free of charge to customers who purchased STs from them. Atari claim that the recent settlement between Apple and DR will not affect TOS/GEM and do not plan to make alterations at the present time. Any future alterations which may become necessary will be cosmetic only and will not affect the performance of any previously released software.

ST WARRANTY

Rumours in the States that Atari do not provide a warranty are certainly not true in the U.K. Les Player of Atari explained that Atari have passed the warranty to the distributors who were carefully chosen on their ability to effect the necessary repairs or service. In some cases your dealer will provide the warranty but either way the ST comes with a full 1 year warranty. Any problems will be sorted out by your dealer or distributor.

GEM BUG

Beware! Early versions of GEM/TOS have a bug which prevents folders that have an eight letter file name from being opened. Once a file is in, there is no way out! The initial solution is to ensure that you use short file names for folders but if you have got yourself in this predicament the only answer is to use a disk editor to change the filename on disk. Hippo Disk Utilities is available now for this job.

260ST?

"End of this year or beginning of next year". Apparently there are problems with the modulator.

SOFTWARE AVAILABLE NOW ... All of the Infocom adventures, Hippo C, Hippo Disk Utilities, Hippo Spell, Hippo Simple, K-Seka, K-Ram, Hex, PC Intercomm, Mark of the Unicorn Word Processor, Express Letter Writer, Ultima 2.'Now' is the beginning of November so six weeks have passed, check your dealer.

STOP PRESS ... HABA SYSTEMS INC. of California have announced the formation of HABA SYSTEMS LTD. to handle European distribution of all HABA products. Initial products are HABA Writer, HABA Hippo C and a Hard Disk Drive. Your local dealer will be able to stock these products. HABA Systems Ltd can be contacted at 34, Greenlands Lane, Prestwood, Great Missenden, Bucks. Tel. 02406 6045

FREE SOFTWARE

As well as STWRITER, which owners should have, Atari are offering a superb painting program called NeoChrome. Drawing with a mouse is *so* easy and NeoChrome, even though it was never intended as a commercial program, is far superior to any paint program on the 8-bit machines. You can get a copy from your dealer for the price of a disk. You will need a colour monitor.

COLOUR MONITOR

Atari's colour monitor has still not been released but in the meantime there are cheaper alternatives. The Phillips Video-RGB Monitor CM 8533 retails at around £299 (cable extra) and can double as a monitor for the 130XE or 800/XL. Quality is superb. The ST really comes alive in colour!

Wootton Computers in Crewe can supply this monitor and a cable for the ST. Phone 0270 214118 for price and details.

OTHER NEWS

Several of the software packages demonstrated at PCW have been taken up by ANTIC magazine for U.S. distribution thus ensuring smaller U.K. developers an outlet in the States.

Silica Shop have over 170 'announced' software package in their latest ST price list from 61 different companies, most of them British. In addition they list another 34 companies who will be developing software but who are not yet prepared to announce titles. If you can't find the software you want in 1986 you are not looking!

One American company that has really taken the ST to heart is Hippopotamus Software who were among the very first to complete software packages. Many of these were originally written for the Macintosh but have been converted to the ST in super quick time. An amazing variety of finished (and available) products include an Almanac with over 35,000 entries, Jokes and Quotes, Ramdisk and Disk Utilities. In the pipeline are an Eprom Burner, a half megabyte upgrade, a spelling checker, and HippoArt which is a collection of hi-res pictures for use with Atari's NeoChrome and Backgammon. Several of these products will be available from Software Express.

THE PRESS RELEASES

TDI SOFTWARE LTD .... announce TDI MODULA-2/ ST which allows programmers to write GEM applications for the 520ST in a true 32-bit language. Modula-2 is an advanced language that users of Pascal will learn in a few days. Several business packages and database are planned under the Modula-2 system. Details from TDI 0272 742 796

TDI SOFTWARE LTD ... UCSD Pascal/P-SYSTEM operating system for the 520ST. A wide range of single and multi-user P-SYSTEM software has already been developed with over 140 packages for business, accounting, CAD and vertical markets. Much of this software will rapidly become available for the ST. UCSD Pascal is available immediately. Details from TDI at 0272 742796

GST COMPUTER SYSTEMS ... GSTC - a C compiler with full GEM window support, standard libraries, simple assembler, editor and linker at £60, GST ASM a full 68000 macro assembler complete with editor at £40 and GST EDIT, a multi window GEM screen editor at £25. Details from Electric Software Ltd. Tel. 9054 81991

ST ST ST ST ST ST

ASSEMBLERS FOR THE ATARI 520ST

A review of the Kuma K-SEKA assembler and Metacomco Macro Assembler

By Matthew Jones

As someone who has written several big programs using an 8 bit macro assembler (AMAC), I was interested to see what sort of facilities the macro assemblers for the 16 bit 520ST would give me. The two I have had the opportunity to review so far are obviously meant for two different types of user.

The Kuma K-SEKA is actually a complete editor / assembler / linker / debugger program. It provides all you need to write programs in 68000 assembly language. The problem is, as with many programs that 'do everything', it doesn't do some parts very well. The first thing that any programmer uses (on the computer) is the editor. The editor of the KSEKA is a simple line editor, i.e. one line at a time, with no facility to cursor up and down. I am used to using EDLIN on the IBM PC, which is pretty poor, but in comparison I have to say that the K-SEKA editor is worse.

The most noticeable missing feature is the ability to list ten lines each side of the line you are working on (the current line), the P command being nowhere near good enough as it alters the current line.

Commands available are: Insert text; Edit current line; Target to line (change current line); Bottom of text; Up n lines; Down n lines; Print (display) n lines; Zap (delete) n lines; Locate text; Kill text; Old (unKill) text and Howbig (sic) are files. To get the best out of the K-SEKA, I would use a dedicated editor for the major typing, and only use this basic editor for small debugging changes.

The assembler itself handles all of the standard (Motorola) mnemonics (as does the Metacomco Macro Assembler). What is of relevance to the programmer is the extra facilities that the assembler gives, provided by pseudo ops. (A standard line of machine code consists of an optional label (a symbol which identifies a particular memory location), an opcode (the instruction the 68000 understands), an optional operand (the data the instruction acts upon), and an optional comment line. A pseudo op is an opcode which is not converted to an instruction for the 68000, but is an instruction to be acted on by the assembler.) The table shows a general comparison of most of the available pseudo ops in AMAC, the Atari Macro Assembler for 8 bit machines, MAC65, the OSS 8 bit macro assembler, and the 68000 processor K-SEKA and Metacomco Macro Assembler (referred to hereafter as ASSEM, as it is called on the disk).

One of the most immediate observations about K-SEKA is that it is only suitable for small programs. When I say small, I mean however much you can fit into the edit and code buffers at the same time. K-SEKAs' most noticeable missing pseudo op is INCLUDE. Without this you cannot assemble very large programs, reading through several files to produce a final big machine loadable (object code) file. Not only that, but the object file cannot be written to disk until after assembly. The advantage of this method of working is that it is very fast, and should allow a very fast edit-assemble-run-debug time.

One thing that users of the 8 bit assemblers will find new is that most 68000 programs will need 'linking' (except BASIC and LOGO). Linking is needed because the programs are assembled (or compiled) to an object code file which cannot be loaded and run as is, but must be converted first. This allows a program to be written and assembled in several smaller more manageable parts and put together (linked) later. The K-SEKA however does not need this stage (as it cannot generate code in sections), and the code produced can be run straight away. A limited linking facility is provided, but it is of little use as it only produces absolute not relocatable code. TOS, the 520ST disk operating system, generally uses relocatable code which allows it to have several programs loaded at the same time. Absolute code always loads at the same place in memory, which may cause compatibility problems later.

Kuma does not call the K-SEKA a macro assembler, just an assembler, but it does have macro facilities. A macro is a predefined piece of code that can be used as though it were a machine opcode. For instance, you may want to have the console bell ring at several places in your program. The assembler code to do this would be:

```
        MOVE     #7,-(SP)    ;move bell char to stack
        MOVE     #2,-(SP)    ;GEMDOS function 2
        TRAP     #1          ;call GEMDOS
        ADDQ.L   #4,SP       ;restore stack
```

By changing this to:

```
BELL:   MACRO                ;start of macro
        MOVE     #7,-(SP)    ;move bell char to stack
        MOVE     #2,-(SP)    ;GEMDOS function 2
        TRAP     #1          ;call GEMDOS
        ADDQ.L   #4,SP       ;restore stack
        ENDM                 ;end of macro definition
```

the assembler remembers the text when it is read. The programmer can then use it at any time by simply using the command:

```
        BELL                 ;ring bell
```

The macro assembler will replace this with the previously defined code. This looks similar to subroutines, but the code is copied at each use, a subroutine only exists in one place. Parameters can also be passed to the macro definition, so BELL 4 could ring the bell four times.

ASSEM, the Metacomco assembler, has a very full featured macro facility. In fact, most of the things that it does are done very well. For instance it can use all available program segments (a separate section for the actual code, the data and the uninitialised data), the K-SEKA only has the former two. The object files produced must be linked before they can be run, and the Digital Research LINK68 and RELMOD programs are provided for this. LINK68 is too complicated for this review, but comes with GEM libraries and various object files which the serious programmer will need for the best use of the computer. No documentation is provided for these, so it may cost extra.

When it comes to the problems of ASSEM, I have only relatively minor quibbles. K-SEKA, and all other assemblers I have known (IBM PC as well) start a comment at the end of a line with a semicolon (;). ASSEM will accept the semicolon start, but it also assumes that any text after the operand, starting with a space character is also a comment. This to me is a great mistake. I can imagine accidental spaces occurring during an edit which cause the loss of part of the operand to ASSEM, leaving a syntactically correct line which is actually wrong, which means I would be searching for hours (days) for a problem that most other assemblers would list as an error due to the lack of semicolon. Another quibble is that the EQU pseudo op cannot be interchanged with the equals (=) character. I so much prefer it.

Metacomco provide all you need to write programs on their disk. Their screen editor, ED, is provided. I have been using this

for some months now, and I find it very irritating. It has all the usual facilities of a screen editor (a screen editor means you can use the cursor to scroll up and down, like Atariwriter), though some need a combination of commands. For instance to do a block move, you must do an insert block then a delete block. Each command can be repeated until an error occurs, so a global search and replace is possible. However this is very slow as ED spends a lot of time showing you how it removes each character of the old word, and then inserts each character of the new. Very pretty I'm sure, but a big waste of time. What has to be my biggest frustration is that the block markers are not visible and they disappear very easily. This means that you cannot mark a block at one end of the text buffer, go to the other end doing a bit of editing on the way and expect the block to still be marked when you get to where you want to move it. Still, it is far more useable than the K-SEKA editor.

What ASSEM does not provide but K-SEKA does is a debugging facility. K-SEKA allows you to set breakpoints, single step, and all the usual debugger functions, as well as a disassembler. Digital Research can provide a debugger for the LINK68 program.

Conclusion

To sum up, K-SEKA is most useful to the programmer interested in learning 68000 assembler. It provides everything you will need (except perhaps a better editor) and whilst it does have a size limitation, on a 512K machine, I can't imagine it being reached too early.

The Metacomco Macro Assembler (ASSEM) is obviously aimed at the more professional programmer. It provides all the pseudoops you would expect and more, comes with libraries, a linker and an editor. The edit-assemble-run-debug time will be a lot longer, but the program could be a much bigger one. The K-SEKA will have uses for the ASSEM user as an experimentation tool.

Though I don't know the Atari Assembler-Editor cartridge very well, I would say that it is to AMAC, what K-SEKA is to ASSEM. K-SEKA is ideal for the beginner, and masterpieces can be written, but they are easier with ASSEM.

Finally, it is worth saying that neither of these assemblers come with more than a reference manual. Certainly they are not going to teach you 68000 assembler, you must buy a separate book for that.

I hope to review other assemblers and languages for the ST as soon as I get them.

Footnote: Metacomco will be making their assembler compatible with both the Digital Research LINK68 and the GST linker. At the time of writing it had not been decided who's linker and libraries will actually be supplied on the disk. The DRI libraries are the 'official' GEM libraries, but I daresay that the GST libraries, if they are good, will be used by more people. Contact Metacomco for more details.

Metacomco Macro Assembler - £49.95
METACOMCO, 26 Portland Square, Bristol, Avon, BS2 8RZ.
Tel. (0272) 428781

Kuma K-SEKA - £49.95
KUMA, 12 Horseshoe Park, Pangbourne, Berks, RG8 7JW.
Tel. 0735 74335

Table 1. This table lists all the major pseudo ops available to each assembler. The 68K assemblers are listed alongside those of the 6502 assemblers to aid owners of those assemblers in a comparison.

The pseudo ops are listed in the following assembler order:

	AMAC	MAC65	K-SEKA	ASSEM
GENERAL PSEUDO OPS				
Set origin (RORG=relative origin)	ORG	*=	ORG,LOAD	RORG
Set location counter (for overlays)	LOC	none	n/a	n/a
Assemble to different parts of program file (segments).	USE	none	CODE,DATA	SECTION, BSS,DATA TEXT,OFFSET
End of program.	END	.END	END	END
Conditional assembly features, e.g. extra code to be assembled in a debug version.	IF ELSE ENDIF	.IF .ELSE .ENDIF	IF ELSE ENDIF	IF none ENDC
Check condition, and generate assembly error if false. Used for checking if memory requirements are too big etc.	ASSERT ERR	.ERROR	none	FAIL
Local labels. These can only be used in the same 'local' section of code. The Metacomco locals only exist between normal global labels, the 'global' labels are only global in the file though, and not known by the linker unless told about them.	: PROC EPROC	? .LOCAL	none none	$ (major labels)
Align to a boundary. Forces the program counter to an even (odd) boundary, needed for some 68000 instructions.	n/a	n/a	EVEN/ODD	CNOP
Generate illegal opcode for debugger.	none	none	ILLEGAL	none
Define a label as global for linker. (Permits label use in another file.)	n/a	n/a	GLOBL	XDEF XREFa
Include a file for assembly. Useful for defining symbols across files, e.g. EOF,EOL etc.	INCLUDE	.INCLUDE	none(!)	INCLUDE
SYMBOL DEFINITION PSEUDO OPS				
Define a symbol.	= EQU	.=	= EQU	EQU EQUR,REG
Define an alterable symbol.	SET	none	none	SET
Allocate space in memory. Code is written to file.	DB DC DW	.BYTE .SBYTE .WORD	DC.size (.size=.B, .W,.L)	DC.size (.size=.B, .W,.L)
Special format field lengths.	REAL6,VFD	none	none	none
Allocate large spaces in memory (for tables etc.), but don't initialise.	DS	none	BLK	DS
As above but initialise (fill) the space defined.	ECHO DB ENDM	none	BLK	DCB
MACRO PSEUDO OPS				
Start a macro definition.	MACRO	.MACRO	MACRO	MACRO
Stop macro assembly (for use with conditional tests)	none	none	none	MEXIT
Ability to define unique labels within macros.	%K	none	?0	
Stop macro definition.	ENDM	.ENDM	ENDM	ENDM
Ability to assemble direct to memory for immediate running?	NO	YES	YES	NO

OTHER FUNCTIONS

All of the assemblers have the ability to turn the generation of code and/or listings on and off. Listings can be with or without conditionals, macros, paging, title (except KSEKA), and some have a page eject feature. MAC65 is the only one that needs line numbers in the source, something that would cause the others to splutter.

ST ST ST ST ST ST

The Lost Kingdom of Zkul
West
an Adventure Twin Pack
from Talent Computer Systems
£24.95

One of the temptations of the ST for existing Atari owners will be the availability of new software which will not become available on the 8-bit machines. A vast range of programs currently available for the QL and Macintosh will become available in the months ahead and one of the first conversions from the QL comes from Talent Computer Systems.

Of all the different types of entertainment software, the one form that is likely to be most successful on the ST is the adventure and already Infocom have their entire range available. For an existing Atari adventurer this will not be sufficient to make the commitment but the availability of two brand new adventures on one disk at almost half the price of Infocom games must be tempting! The two adventures are in different styles with WEST as an introductory adventure featuring a great deal of 'real-time' action and The Lost Kingdom of Zkul as the 'classic' adventure based more on the dungeons and dragons style with fantasy, fighting, treasures and difficult puzzles and mazes.

WEST is set in 1885 with you on the track of a notorious gang of robbers. They have hidden the proceeds of a bank raid in town and you must recover this loot whilst outwitting - and outgunning - the robbers and seeking ways to escape from town. The adventure follows the familiar format with reasonably lengthy location descriptions and plenty of action. Locations are described in full when you first visit them but are described briefly when you next visit unless you LOOK around. One of the first things you will notice is the sudden appearance of mean looking robbers and other protaganists who will kill you if you do not act quickly enough. This does not mean thinking of the right thing to do but literally reacting quickly for the events continue as you think and you are likely to get killed before typing the next command. Unfortunately this aspect can become rather frustrating as it is quite easy to die just after being re-incarnated due to some random event. You have three lives and are re-incarnated each time at the starting location minus any items you were carrying which remain with your 'other body'. As you progress through the game a second time you see the results of all your earlier actions until you come to 'a familiar looking body'! Here you can pick up all items you previously had before proceeding further. Some events seem slightly illogical like your horse who acts like a homesick homing pigeon by wandering off and then always finding you a few moves later wherever you may be, but in general there are plenty of puzzles to solve in time honoured tradition. Talent say that this is the easier adventure but it should prove entertaining to all.

The Lost Kingdom of Zkul is much more in the classic vein with time to think and solve puzzles, traps for the unwary and over two hundred locations to explore. Set in another time and place you set forth to find the treasures hidden long ago by dwarves in the Doomed City. As usual many have failed before you with the guidance of your friend Eldomir you seek the Lost Kingdom and its treasures. Eldomir does not seem to be of much help as he sits in a hut in the forest acting as a base for you to return treasures to, so you are really on your own. As well as exploring you must look after your health by drinking and eating at the appropriate times and healing yourself following fights. You must find a way to communicate with the various dwarves that appear and magically disappear and avoid the usual perils of death. You have three lives which are given to you with increasing impatience by some 'benign being' before being condemned to re-boot the game. Points are scored for finding and returning treasures, visiting difficult locations and for finishing the game. Points are deducted for getting killed, saving the game or using bad language! To become a Grandmaster requires that you complete the game with one life and without saving!

I am unable to comment on complexity as compared with Infocom, as the review versions were specially scaled down demonstration copies but from the feel of the initials moves and encounters I am sure expert adventurers will not be disappointed. Novices will find this package very pleasing for it comes with a twenty page introduction which includes many helpful ideas for these and other adventures. Quite welcome this as many people buy adventures on recommendation from more expert players only to find themselves stuck from the start.

Common to both games is a novel game save feature which allows you to compose up to a screen of notes to jog your memory later on. Very useful if you have limited time to play or become involved in other adventures between sessions. Both games work on the monochrome or colour monitors using 80 columns on both and the only difference is a title picture which is loaded on the colour monitor but which has no effect on the games. It seems to be there simply as an excuse to use the colour!

Two adventures for £24.95 can't be bad when compared to some prices on the 8-bit systems and these represent one small reason for committing yourself to an ST! ●

K-RAM
Kuma
£29.95

One of the first things any programmer will require is a set of utilities and the first of these to become available in the U.K. is the Kuma Ramdisk. A Ramdisk allows a portion of memory to be set aside and protected for use as a 'disk drive'. All the usual functions of a drive can be used such as saving, copying, deleting files etc. but at phenomenal speed and without ending up with a lot of junk on your disks. Chunks of code can be worked on, saved to Ramdisk, tidied up and committed to floppy disk only when completed. 8-bit users will not have appreciated the power of a Ramdisk unless they have the 130XE but there is no denying that the Ramdisk is a very useful utility.

K-RAM allows you to set up any number of Ramdisks, depending on memory, and to configure these to whatever size you wish. Each ramdisk created will have its own icon on screen which can be used in the same way as existing icons. When first run K-ram indicates how much memory is available and allocates a default of half of this for the first ramdisk. You may change this to any reasonable figure or do the opposite by telling K-RAM how much memory you require to reserve for your program and it will allocate the rest as the ramdisk. To install multiple ramdisks you merely run the program again.

With TOS on disk only 162k of memory is available and the use of multiple ramdisks is fairly restricted but once TOS is on ROM K-RAM will allow programmers great flexibility. An additional facility allows you to toggle the write verify to the floppy disk thus allowing writes to disk to occur nearly 50% faster whilst more advanced users can customise the BIOS parameter block that K-RAM uses to change the size of the directory area giving more disk space or alternatively allowing more file names to be held in the directory.

Programmers will find that K-RAM fits nicely into their utility library. ●

PROGRAMS?

What do you do with an ST that comes only with Logo, if you don't know anything about Logo? Play around is the answer and you may like to load up Logo and type in these snippets.

First we have BOB which shows a most strange set of characters actually built into the character set of the ST. Anyone you recognise?

```
TO BOB
TYPE CHAR 28 TYPE CHAR 29
TYPE CHAR 30 TYPE CHAR 31
BOB
END
```

Once typed in, you will get the message 'BOB defined'. Open up the dialog window to full screen and type BOB [RETURN].

Now try SQUARES (a much longer programming exercise, wow!)

```
TO SQUARES :SIDE
FD :SIDE RIGHT 90
MAKE "SIDE :SIDE+2
IF :SIDE>80 [REV 1]
SQUARES :SIDE
END

TO REV :ADD
MAKE "SIDE :SIDE - 2
BACK :SIDE LEFT 90
IF :SIDE<1 [MAKE "ADD :ADD+1 SQUARES
:ADD]
REV :SIDE
END
```

When you have typed it you will get the messages SQUARES defined and REV defined. Type SQUARES 4 [RETURN] and watch. Try changing the line colour and background colour on the Settings. Typing CS will clear the screen and activate your revised colours.

At least it's something to type in, but surely you can do better? Any demos would be welcome.

Q. What has over 35,000 facts?

HIPPO ALMANAC

Hippopotamus Software

£34.95

Imagine a disk containing over 35,000 facts and figures on many different subjects all available at the typing of a sentence or question. Subjects as diverse as geography, history, unit conversions, sports, languages, science, awards and prizes. These and many more are all contained on the Hippo Almanac. A trivia fan's dream come true and a chance to educate yourself and your family? Well, yes, but there are a number of limitations, it is not quite like having an encyclopedia.

As with most databases you must ask questions that the program is capable of understanding and you will find that the type of question you can ask is fairly limited however this is not to say that there are not clever aspects to the Almanac. Initially you enter the time and date of using the program and your situation in the world vhich are then used as reference points. You can ask 'How many days to December 25?' or 'How far is it to Los Angeles' or 'What time is it in Tokyo'. You can ask 'from ... to' type questions or 'What', 'Where' or 'What happened on' questions and provided you stay within the main format you will get the answer required.

You can ask factual questions about any of the subjects in each main category or call up a help screen which tells you what subcategories are available. Much of the information, such as telephone codes, is U.S. based and therefore of little use but there are certainly enough facts to keep you occupied for some time. Lets give you a couple of examples of how the Almanac breaks down a category. In Geography you may ask the distance between any two places, where any city or country is or what cities are in a given country. You may ask the population of cities, states and countries ,the area of states or countries, what currency is used in a particular country and capitals. In addition there is U.S. specific information such as telephone codes. In the Science category you can find out the size, gravity, length of day and year, distance and density of all planets in the solar system or ask for many geometric or mathematical formulas.

Perhaps one of the most useful aspects is the ability to add or delete your own information and recall it by keyword. For instance you can create your own telephone directory by typing 'Remember PAGE 6 - 0785 41153'. The program will save this to disk and when you type 'PAGE 6' it will recall the number. To delete information, you just type forget .... With a little bit of thought this could make Hippo Almanac one of the cheapest databases for personal use that you are likely to find. You could list telephone numbers, addresses, birthdays or whatever and search by any keyword. If, for example you wanted to telephone someone you knew in London you need only type '01' and you will get a list of London numbers on your directory.

If you accept that there are some limitations and that a certain amount of information is relevant only to the U.S. then you will get a great deal of information from the Almanac. You can use it for educational purposes but most likely you will just use it as a form of trivial pursuit. There is nothing wrong with that, I could spend many more hours digging up trivial facts than I could playing Space Invaders!

Hippo Almanac is available from Software Express.

MAGFILE

an indexing and record keeping utility by Chris Davis

Over the last couple of years I have built up a considerable collection of magazines, books and technical data for the ATARI computers and it had become quite difficult to locate a particular piece of information. I badly needed a filing or indexing program and as I could not afford a commercial 'database' type program, I looked around in the magazines for a suitable program. ANALOG had a couple but they did not do what I wanted, so I set about writing MAGFILE. Whilst it is specifically set up for computer information from magazines, there is no reason why the section headings could not be changed to allow the program to function for other record keeping purposes.

HOW IT WORKS

After a brief initialisation and a title screen, a menu of 22 categories is displayed. These have been chosen after a great deal of trial and error but , of course they may be changed if desired. The idea is to choose one from the left column and one from the right, thereby forming a unique 2-word category/file reference. There are a maximum of 121 combinations but some will never be used. The choices will be highlighted and any incorrect keypresses are error-trapped. A second menu will now appear giving 5 options and again your choice will be highlighted.

The functions on this Menu are as follows:

OPEN NEW FILE - This is the first choice for every new selection. It will write a file to disk with a filename extender being formed by the letter and number of your chosen two-word category. This file can be updated at any time by using -

APPEND CURRENT FILE - All new records are stored using this function. When selected, you will be asked the following:

TITLE?	Type up to 14 characters and press RETURN.
MEDIA?	Type the first letter of one of the 5 options shown and press RETURN
LOCATION?	Type up to 10 characters and press RETURN
DETAILS?	Type up to 10 characters and press RETURN

Your entries will then be displayed as a record and you can accept it for filing or refuse it if there is a mistake. You can then make more entries or return to the category menu.

ERASE OLD FILE - This is pretty drastic as it will cause the loss of all records in the selected file. Use with caution!

LIST CONTENTS OF FILE - This will display all the 40 byte records in a file, one after the other, on a filing card. When a card is full, a keypress will display the next one. The top line will show the file no., the filename and the card no.

DELETE RECORD - This allows you to remove any number of records from a file. Records will be displayed one at a time and may be retained or deleted as desired.

If you select the wrong category the ESC key may be used to start over again.

The white line across the middle of the screen is for messages and commands. All likely errors have been trapped and should ensure no loss of records or halting of the program. Keep the volume on yourTV or monitor turned up when using this program as the resultant noise can prove helpful.

WILDCARD CATEGORIES

As already mentioned there are 22 categories to choose from. The bottom one in each column is designated as a 'wildcard'. Either one can be used with another category to make up a file. Both can be used together if desired! When selected, your disk drive will search for the file. If found, the alternative category will replace the word 'WILDCARD' in the menu. If not found, you will be prompted to input your new category. Your typing will print in inverse which is correct. Press RETURN after typing and the new entry will appear in the menu. The program now continues as before.

The only way to stop the program is with the SYSTEM RESET key, however DO NOT PRESS IT DURING DISK I/O as this could result in the complete loss of a file.

I have tested MAGFILE on DOS 2.0 / 2.5 and DOS 3.0 and it seems happy. There are 3 machine language routines included none of which are unusual, so there should be no problems on any machine. The routines are used in lines 1550 which is the 'rainbow' routine used in the opening title, line 1560 which is a VBI used to force inverse video and capitals on or off as necessary and line 1570 which is a DLI used to change the colour of the top line of the filing card.

I may consider adding search and sort routines at a later date if there is a need. Any comments or other suggestions for improvements would be welcome via PAGE 6.

```
CS 1 REM ################################
WW 2 REM #          MAGFILE            #
ZV 3 REM #            by               #
YI 4 REM #        Chris Davis          #
SG 5 REM # --------------------------- #
XD 6 REM #  PAGE 6 MAGAZINE - ENGLAND  #
CY 7 REM ################################
NN 8 REM
JQ 90 GOTO 1400
KX 100 REM * SUBROUTINES *
CS 110 POSITION 1,13:? MC$;:RETURN
RK 120 OPEN #1,4,0,"K:":GET #1,KEY:CLOSE
   #1:RETURN
WW 130 POSITION 1,13:? "K";MES$:CLOSE #2:
   RETURN
CT 140 FOR V=15 TO 0 STEP -0.2:SOUND 0,0,
   2,V:NEXT V:FOR D=1 TO 300:NEXT D:RETUR
   N
KR 150 REM * ERROR TRAPS *
NE 160 ERRNO=PEEK(195):IF  NOT DR THEN GO
   SUB 110
BZ 170 IF ERRNO=144 THEN MES$="DISK NOT I
   NSERTED, OR NOT LOCKED IN!":GOSUB 130:
   GOTO 260
IX 180 IF ERRNO=138 THEN MES$="DRIVE UNCO
   NNECTED, OR NOT TURNED ON!":GOSUB 130:
   GOTO 260
RI 190 IF ERRNO=170 THEN MES$="FILE    NO
   T FOUND!":MES$(6,6)=CHR$(L+128):MES$(7
   ,7)=CHR$(N+128):GOSUB 130:GOTO 260
MK 200 IF ERRNO=167 THEN MES$="FILE    AL
   READY OPEN!":MES$(6,6)=CHR$(L+128):MES
   $(7,7)=CHR$(N+128):GOSUB 130:GOTO 260
YM 210 IF ERRNO=136 THEN CLOSE #2:GOTO CA
   RD
FP 220 IF ERRNO=5 THEN CLOSE #2:XIO 35,#2
   ,0,0,PROG$:DEL$="":GOTO MENU1
BY 230 IF ERRNO=169 THEN MES$="DIRECTORY
   FULL-change disk & press key":GOSUB 13
   0:GOSUB 120:IF KEY THEN 1080
FD 240 IF ERRNO=162 THEN MES$="DISK FULL-
   change disk & press a key":GOSUB 130:G
   OSUB 120:IF KEY THEN 1080
DJ 250 POSITION 1,13:? "KKError ";ERRNO;"
    at line no.";PEEK(186)+PEEK(187)*256
OI 260 BC=PEEK(710):POKE 710,50:FOR D=1 T
   O 700:NEXT D:POKE 710,BC:GOTO MENU2
YI 270 REM * CARD *
SC 280 POKE 82,0:POKE 83,39:POKE 712,4:PO
   KE 710,154:POKE 709,2:POKE 752,1:B=1:E
   =40:LT=LEN(TEMP$)
CV 290 IF  NOT DR THEN DL=PEEK(560)+PEEK(
   561)*256:POKE DL+3,194:POKE 512,23:POK
   E 513,6:POKE 54286,192:C=1
YW 300 ? "K  ";MC$:POSITION 0,0:? "FILE "
   ;CHR$(L+128);CHR$(N+128);" - ";L$;" ";
   N$:? TL$;
LQ 310 ? "|       TITLE       |M| LOCATION | D
   ETAILS   |";
VG 320 ? "|-----------------------+-+-----------+
   -----------|";DL$;
LF 330 IF LT=0 THEN ? "         THIS FILE CON
   TAINS NO RECORDS!          ":GOTO 400
JP 340 IF DR THEN ? BL$:GOTO 1330
BH 350 POSITION 38,0:? C:POSITION 0,4
RJ 360 REC$=TEMP$(B,E):? REC$;:IF LT=E TH
   EN ? BL$;"             RECORDS END
                     ";:GOTO 400
QU 370 IF PEEK(84)=20 THEN 390
GA 380 B=B+40:E=E+40:GOTO 360
OE 390 ? BL$;"     Press 'RETURN' for more
    records        ":C=C+1
QE 400 POSITION 5,23:? "Press 'ESC' to re
   turn to menu";
OO 410 GOSUB 120:IF LT>E AND KEY=155 THEN
    B=B+40:E=E+40:GOTO 300
OV 420 IF KEY<>27 THEN ? "K";:GOTO 410
FR 430 POKE 54286,64
WF 440 REM * MENU1 *
JY 450 POKE 82,1:POKE 83,38:GRAPHICS 0:PO
   KE 752,1:POKE 712,50:POKE 710,2:POKE 7
   09,12:POKE 16,64:POKE 53774,64
CL 460 ? "A Basic              0 Demos"
DL 470 ? "B Non-Basic          1 Games"
KN 480 ? "C Graphic            2 Utilities"
LP 490 ? "D Player/Missile     3 Editors"
CV 500 ? "E Character          4 Sets"
EJ 510 ? "F Sound              5 Routines"
GG 520 ? "G Education          6 Tutorials"
PN 530 ? "H Hardware           7 Articles"
GO 540 ? "I Game Software      8 Reviews"
HU 550 ? "J Non-game S/ware    9 Informatio
   n"
ES 560 ? "X Wildcard           X Wildcard"
AU 570 POSITION 1,12:? CL$:GOSUB 110:POSI
   TION 1,14:? CL$:POSITION 1,13:? "Enter
    1 letter and 1 number";
VW 580 OPEN #1,4,0,"K:":GET #1,L:CLOSE #1
JH 590 IF L=65 THEN L$="BASIC":POSITION 3
   ,0:? L$
QF 600 IF L=66 THEN L$="NON-BASIC":POSITI
   ON 3,1:? L$
PF 610 IF L=67 THEN L$="GRAPHIC":POSITION
    3,2:? L$
FK 620 IF L=68 THEN L$="PLAYER/MISSILE":P
   OSITION 3,3:? L$
TW 630 IF L=69 THEN L$="CHARACTER":POSITI
   ON 3,4:? L$
XI 640 IF L=70 THEN L$="SOUND":POSITION 3
   ,5:? L$
IY 650 IF L=71 THEN L$="EDUCATION":POSITI
   ON 3,6:? L$
NK 660 IF L=72 THEN L$="HARDWARE":POSITIO
   N 3,7:? L$
EC 670 IF L=73 THEN L$="GAME SOFTWARE":PO
   SITION 3,8:? L$
HH 680 IF L=74 THEN L$="NON-GAME S/WARE":
   POSITION 3,9:? L$
OA 690 IF L=88 THEN POSITION 3,10:? "WILD
   CARD":GOTO 710
KY 700 IF L<65 OR L>74 THEN ? "K":GOTO ME
   NU1
XQ 710 OPEN #1,4,0,"K:":GET #1,N:CLOSE #1
TN 720 IF N=48 THEN N$="DEMOS":POSITION 2
   2,0:? N$
KZ 730 IF N=49 THEN N$="GAMES":POSITION 2
   2,1:? N$
ZM 740 IF N=50 THEN N$="UTILITIES":POSITI
   ON 22,2:? N$
LT 750 IF N=51 THEN N$="EDITORS":POSITION
    22,3:? N$
XF 760 IF N=52 THEN N$="SETS":POSITION 22
   ,4:? N$
SU 770 IF N=53 THEN N$="ROUTINES":POSITIO
   N 22,5:? N$
SG 780 IF N=54 THEN N$="TUTORIALS":POSITI
   ON 22,6:? N$
RW 790 IF N=55 THEN N$="ARTICLES":POSITIO
   N 22,7:? N$
EH 800 IF N=56 THEN N$="REVIEWS":POSITION
    22,8:? N$
TP 810 IF N=57 THEN N$="INFORMATION":POSI
   TION 22,9:? N$
QD 820 IF N=88 THEN POSITION 22,10:? "WIL
   DCARD":GOTO 840
OJ 830 IF N<48 OR N>57 THEN ? "K":GOTO ME
   NU1
```

```
IK 840 PROG$(12,12)=CHR$(L):PROG$(13,13)=
    CHR$(N):GOSUB 110
ZS 850 IF L=88 OR N=88 THEN GOSUB 990
XC 860 REM * MENU2 *
KX 870 GOSUB 110:POSITION 1,13:? "Select
    from options below"
LL 880 POSITION 1,16:? "Open new file":PO
    SITION 1,17:? "Append current file":PO
    SITION 1,18:? "Erase old file"
HO 890 POSITION 1,19:? "List contents of
    file":POSITION 1,20:? "Delete record"
HF 900 POSITION 1,23:? "ESC to cancel ent
    ries";:GOSUB 120:GOSUB 110:REC$="":TEM
    P$="":DR=0
RH 910 IF KEY=79 THEN POSITION 1,16:? "OP
    EN NEW FILE":GOSUB 1080:GOTO MENU2
SQ 920 IF KEY=65 THEN POSITION 1,17:? "AP
    PEND CURRENT FILE":POSITION 1,23:? EC$
    ;:GOSUB 1140:GOTO MENU1
KI 930 IF KEY=69 THEN POSITION 1,18:? "ER
    ASE OLD FILE":GOSUB 1280:GOTO MENU1
FE 940 IF KEY=76 THEN POSITION 1,19:? "LI
    ST CONTENTS OF FILE":GOTO 1110
BC 950 IF KEY=68 THEN POSITION 1,20:? "DE
    LETE RECORD":DR=1:DB=1:DE=40:GOTO 1110
MW 960 IF KEY=27 THEN GOTO MENU1
GY 970 ? "K";:GOTO 870
BT 980 REM * WILDCARDS *
BX 990 TRAP 1030:OPEN #2,4,0,PROG$:INPUT
    #2;L$:INPUT #2;N$:CLOSE #2
DS 1000 IF L=88 THEN POSITION 3,10:? WC$:
    POSITION 3,10:? L$
DI 1010 IF N=88 THEN POSITION 22,10:? WC$
    :POSITION 22,10:? N$
AF 1020 RETURN
ET 1030 CLOSE #2:POKE 752,0:POSITION 1,13
    :? "Input new category below":POKE 157
    6,128
SD 1040 IF L=88 THEN POSITION 2,16:INPUT
    L$:POSITION 3,10:? WC$:POSITION 3,10:?
     L$:POSITION 2,16:? EC$
EO 1050 IF N=88 THEN POSITION 21,16:INPUT
     N$:POSITION 22,10:? WC$:POSITION 22,1
    0:? N$:POSITION 21,16:? EC$
KO 1060 POKE 1576,0:POKE 752,1:GOSUB 110:
    RETURN
NT 1070 REM * OPEN NEW FILE ON DISK *
EJ 1080 TRAP ERROR:OPEN #2,8,0,PROG$:? #2
    ;L$:? #2;N$:CLOSE #2:XIO 35,#2,0,0,PRO
    G$
QL 1090 POSITION 1,13:? "FILE ";CHR$(L+12
    8);CHR$(N+128);" OPENED.":GOSUB 140:RE
    TURN
QN 1100 REM * READ FILE FROM DISK *
MC 1110 TRAP ERROR:OPEN #2,4,0,PROG$:B=1:
    E=40:INPUT #2;L$:INPUT #2;N$
RR 1120 INPUT #2;REC$:TEMP$(B,E)=REC$:B=B
    +40:E=E+40:GOTO 1120
LX 1130 REM * APPEND FILE ON DISK *
KX 1140 TRAP ERROR:XIO 36,#2,0,0,PROG$:OP
    EN #2,9,0,PROG$
AF 1150 POKE 752,0:POSITION 1,13:? "TITLE
             K":POSITION 7,13:INPUT
     TIT$
KD 1160 POSITION 1,13:? "MEDIA - (Mag,
    Book, Rom, Disk, Cass)":POSITION 7,13:
    INPUT MED$:GOSUB 110
NO 1170 IF MED$<>"M" AND MED$<>"B" AND ME
    D$<>"R" AND MED$<>"D" AND MED$<>"C" TH
    EN ? "K":GOTO 1160
RK 1180 POSITION 1,13:? "LOCATION
      K":POSITION 10,13:INPUT LOC$:GOSUB
     110
PA 1190 POSITION 1,13:? "DETAILS
      K":POSITION 9,13:INPUT DET$:POKE 75
    2,1:GOSUB 110
DS 1200 FOR Y=16 TO 20:POSITION 1,Y:? EC$
    :NEXT Y
XN 1210 REC$=DL$:REC$(2,15)=TIT$:REC$(17,
    17)=MED$:REC$(19,28)=LOC$:REC$(30,39)=
    DET$
VK 1220 POKE 82,0:POKE 83,39:POSITION 0,1
    6:? TL$;REC$;BL$:POSITION 1,13:? "Acce
    pt this file entry? (Y/N)"
XE 1230 GOSUB 120:IF KEY=89 THEN ? #2;REC
    $
XE 1240 POSITION 0,16:? RC$;RC$;RC$:POSIT
    ION 1,13:? "Any more entries for this
    file? (Y/N)";:GOSUB 120
UH 1250 GOSUB 110:IF KEY=89 THEN 1150
PN 1260 CLOSE #2:XIO 35,#2,0,0,PROG$:RETU
    RN
GP 1270 REM * ERASE FILE ON DISK *
KV 1280 TRAP ERROR:XIO 36,#2,0,0,PROG$
CH 1290 POSITION 1,13:? "Erase file ";CHR
    $(L+128);CHR$(N+128);" - are you sure?
     (Y/N)"
PD 1300 GOSUB 120:IF KEY<>89 THEN XIO 35,
    #2,0,0,PROG$:RETURN
YH 1310 XIO 33,#2,0,0,PROG$:GOSUB 110:POS
    ITION 1,13:? "FILE ";CHR$(L+128);CHR$(
    N+128);" ERASED.":GOSUB 140:RETURN
KQ 1320 REM * DELETE RECORD & RE-WRITE *
NJ 1330 REC$=TEMP$(B,E):POSITION 0,4:? RE
    C$;:FOR V=15 TO 0 STEP -1:SOUND 0,50,1
    0,V:NEXT V
PU 1340 POSITION 1,13:? "Delete this reco
    rd? (Y/N)";:GOSUB 120:IF KEY<>89 THEN
    DEL$(DB,DE)=REC$:DB=DB+40:DE=DE+40
PC 1350 IF E<>LT THEN B=B+40:E=E+40:GOTO
    1330
RV 1360 POSITION 1,13:? "RE-WRITING AMEND
    ED FILE TO DISK"
ON 1370 XIO 36,#2,0,0,PROG$:XIO 33,#2,0,0
    ,PROG$:OPEN #2,8,0,PROG$:? #2;L$:? #2;
    N$:B=1:E=40
SG 1380 TRAP ERROR:REC$=DEL$(B,E):? #2;RE
    C$:B=B+40:E=E+40:GOTO 1380
CB 1390 REM * INITIALIZATION *
OM 1400 DIM PROG$(13),L$(16),N$(16),REC$(
    40),TIT$(14),MED$(1),LOC$(10),DET$(10)
    ,MC$(38),TL$(40),BL$(40),DL$(40)
SY 1410 DIM CL$(38),EC$(21),RC$(40),WC$(1
    6),MES$(38):A=FRE(0)-256:DIM TEMP$(A/2
    ),DEL$(A/2)
AC 1420 TL$="┌──────────────┬─┬──────────
    ──────────┐"
JX 1430 DL$="│              │ │
    │"
ZS 1440 BL$="└──────────────┴─┴──────────
    ──────────┘"
BC 1450 CL$="─":CL$(38)=CL$:CL$(2)=CL$
LL 1460 MC$="█":MC$(38)=MC$:MC$(2)=MC$
XR 1470 RC$=" ":RC$(40)=RC$:RC$(2)=RC$
SG 1480 EC$=RC$(1,21):WC$=EC$(1,16)
LT 1490 PROG$="D1:MAGFILE.  "
FF 1500 ERROR=160:CARD=280:MENU1=450:MENU
    2=870
CX 1510 FOR I=1536 TO 1582:READ A:POKE I,
    A:NEXT I
TD 1520 REM * OPENING TITLE *
OX 1530 GRAPHICS 2:POKE 710,0:FOR Y=0 TO
    9:POSITION 6,Y:? #6;"MAGFILE":NEXT Y
KA 1540 POKE 752,1:POKE 656,1:POKE 657,12
    :? "by Chris Davis":Z=USR(1536):POKE 5
    48,34:POKE 549,6:GOTO MENU1
GO 1550 DATA 104,160,0,162,0,173,11,212,2
    29,20,141,10,212,141,22,208,202,208,24
    2,136,208,237,96
LJ 1560 DATA 72,169,234,141,10,212,141,24
    ,208,104,64
TN 1570 DATA 162,64,142,190,2,162,0,142,1
    82,2,76,98,228
```
□



ATARI ST

520 ST

POWER WITHOUT THE PRICE

THE NEW ATARI 520ST

Under the new leadership of Jack Tramiel (former boss and founder of Commodore Business Machines), Atari Corporation have marked their entry into the world of business/personal computers with a machine which leaves the competition standing. Tramiel's slogan 'Power Without the Price' has been implemented in the manufacture of the new 512K Atari 520ST colour computer which offers the user amazingly high performance at an incredibly low price. Launched as a work-station, this new system incorporates seven software packages as well as the 520ST computer with 512K RAM, mouse controller, high resolution monochrome monitor (640x400), 95 key keyboard (with 18 key numeric keypad), MIDI interface, GEM and a 500K 3½ inch disk drive, all for the package price of only £651.30 (+VAT = £749). Dubbed the 'Mac beater' and the 'Jackintosh' (after Atari's Chief, Jack Tramiel), Atari's new machine has been directly compared with the Apple Macintosh RRP £2595 (+VAT = £2985) which offers similar features and capabilities but at a much higher price. Favourably reviewed by the UK's highly critical specialist computer press, the 520ST is likely to make a great impact in this country as a sophisticated alternative to an IBM PC, APRICOT or APPLE MACINTOSH. Unlike its overpriced competitors, the Atari 520ST can be linked up to a colour monitor to unleash a choice of up to 512 colours. The addition of colour brings out the full potential of graphics packages such as GEM.

USER FRIENDLY GEM OPERATING SYSTEM

The power of the ST is harnessed and made user friendly by the new operating system 'GEM' from Digital Research. GEM stands for Graphics Environment Manager and allows a user friendly colour or B/W graphics interface which closely resembles that of the Macintosh. This similarity extends to the use of moveable resizeable windows, icons to represent objects such as disks and disk drives, and the use of pull down menus and a mouse. The advantage of all this is that the computer becomes extremely easy to use. GEM has now been implemented for the Acorn, ACT, Atari, IBM, ICL, and Olivetti. Software written for GEM on one computer should also run under GEM on another computer. This will enable the market to quickly produce a large library of standard interchangeable software.

FREE SOFTWARE AND FUTURE EXPANSION

The Atari 520ST comes supplied with seven free software packages as listed below: 1) TOS - Tramiel Operating System based on CPM 68K. 2) GEM Graphics Environment Manager by Digital Research (DR) giving a WIMP (Window, Icon, Mouse, Pull down menu) environment. 3) DR GEM Paint for creating graphics masterpieces. 4) DR GEM Write for word processing. 5) Logo learning language to enable you to write your own programs easily using turtle graphics. 6) DR Personal Basic a powerful user friendly version of the Basic programming language. 7) BOS operating system giving you access to dozens of business applications packages already available on the market. Designed with future expansion in mind, the ST also features a host of different interfaces to the outside world and an impressive list of accessories is planned. Atari will soon be releasing a 1000K (1MB) 3½ inch disk drive, and a 15MB hard disk storage system as well as a mass storage compact disk (CD) player capable of storing an entire 20 volume encyclopedia on one disk. A full range of inexpensive printers are planned including dot matrix, daisywheel and thermal colour printers. With its unbeatable graphics, speed and software at a price which is far below that of any comparable personal computer currently on the market, the ST is all set to do battle with the competition. To receive further details of the ST from Silica Shop, just fill in the coupon below with your name and address details and post it to us.

Silica Shop Price: £651.30 + £97.70 VAT = £749.00 This price includes:

- ★ 512K RAM
- ★ B/W MONITOR
- ★ MOUSE
- ★ 500K 3.5" DISK DRIVE
- ★ GEM
- ★ KEYBOARD (95 KEYS)

£749

ATARI 520ST SPECIFICATION

MEMORY
512K RAM (524,288 bytes)
16K ROM expandable to 320K
Port for addnl 128K plug-in ROM cartridges
200K TOS operating system

GRAPHICS
Individually addressable 32K bit-mapped screen with 3 screen graphics modes:
320x200 pixels in 16 colours (low resolution)
640x200 pixels in 4 colours (med resolution)
640x400 pixels in monochrome (high res)
16 shades of grey in low res mode
512 colours available in low/medium res
8 levels of each in red, green and blue

ARCHITECTURE
4 custom designed chips:
GLUE Chip - MMU Memory Mngmnt Unit
DMA Controller - Graphics Processing Unit
16/32 bit Motorola 68000 processor at 8MHz
eight 32 bit data registers
eight 32 bit address registers
16 bit data bus/24 bit address bus
7 levels of interrupts/56 instructions
14 addressing modes/5 data types

DATA STORAGE
High speed hard disk interface
Direct memory access 1.33 Mbytes per second
CD (Compact Disc) interface
Built in cartridge access
Dedicated floppy disk controller

DISK DRIVE
500K (unformatted) s/sided 3½" floppy d/drive
349K (formatted) storage capacity

SOUND AND MUSIC
Sound Generator
Frequency control from 30Hz to above audible
3 voices (channels) in wave shaping sound in addition to a noise generator
Separate frequency and volume controls
Dynamic envelope controls
ADSR (Attack, Decay, Sustain, Release)
Noise generator
MIDI interface for external music synthesizers

KEYBOARD
Separate keyboard microprocessor
Standard QWERTY typewriter styling
Ergonomic angle and height
95 keys including 10 function keys
Numeric keypad — 18 keys including ENTER
One touch cursor control keypad

MONITOR
12" screen - high res monochrome monitor
640x400 monochrome resolution

VIDEO PORTS
Display - Low Resolution - 40 columns
Med/High Res - 40/80 plus cols
Medium res RGB (Red/Green/Blue) output
High resolution monochrome (Black & White)

COMMUNICATIONS
Bidirectional centronics parallel interface for printers, or modems capable of input/output
RS232C serial modem/printer interface
VT52 Terminal Emulation Software
Maximum Baud Rate up to 19,200
High speed hard disk interface
Floppy disk controller (Western Digital)
2 joystick ports (one for 2 button mouse)
MIDI interface for external music synthesizers

GEM WIMP ENVIRONMENT
WIMP - Window Icon Mouse Pop-down menus
Two button mouse controller
Icons/Pull down menus/Windows
GEM VDI - Virtual Device Interface
GEM AES - Application Environment Services
GEM BBT - Bit Block Transfer
Real time clock & calendar

SOFTWARE
GEM environment
with user friendly Macintosh style operation
'TOS' - Tramiel Operating System
Atari's own system based on CP/M 68K with hierarchical directory & file structure plus a host of MS DOS & UNIX command structures
'BOS' - Business Operating System
to run any standard BOS business programs
GEM desktop
with GEM PAINT graphics mgmt system and GEM WRITE word processor
Personal BASIC and DR Logo
originally written by Digital Research (DR) Very much like those on other machines except for the extensive use of pull down menus, mouse control and windows

VARIOUS
Dimensions: 470mmx240mmx60mm
Replaceable external power supplies
Expansion: 3½" floppy disk drives 500K/1,000K (two drives can be connected)
3½" 15Mb hard disk
CD (compact laser disc)
Dot matrix & d/wheel prntrs (black)
Thermal dot matrix (colour)
RGB & monochrome monitors

LANGUAGES
BASIC & LOGO supplied
Many others will soon be available, including: Assembler, BCPL, C, Cobol, Compiled Basic Lisp, Modular-2 and Pascal

Note: Some of the above specifications are pre-release and may therefore be subject to change

MACINTOSH v F1e v 520ST

"Imagine a Fat Mac - the 512K Apple Macintosh - but with a bigger screen, a far bigger keyboard with numeric keypad, cursor and function keys, and colour. That gives you some idea of what the Atari 520ST is like, except for two important things. First the Atari seems faster. Second the Atari system is about one third of the price."
June 1985 - Jack Schofield - **PRACTICAL COMPUTING**

FEATURES OF BASIC SYSTEM	APPLE MACINTOSH	APRICOT F1e	ATARI 520ST
Price includes B/W Monitor	YES	NO - extra £200	YES
Keyboard size mm (LxDxH)	330x147x50	450x167x28	470x240x60
Keyboard size ins (LxDxH)	13x5¾x2	17½x6½x1	18½x9½x2½
3½" D/Drive (Unformatted)	500K	500K	500K
3½" D/Drive (Formatted)	399K	315K	349K
WIMP (Window, Icon, Mouse ...)	Apple	ACT - Activity	GEM
Real-time Clock	YES	YES	YES
Polyphonic Sound Generator	YES	NO	YES
RS232 Serial Port	YES	YES	YES
Centronics Parallel Printer Port	NO	YES	YES
Dedicated Floppy Disk Controller	NO	YES	YES
Hard Disk DMA Interface	NO	YES	YES
Full stroke keyboard	YES	YES	YES
Number of keys on keyboard	59	92	95
Numeric Keypad	NO	YES (18 Keys)	YES (18 keys)
Cursor Control Keypad	NO	YES	YES
Function keys	NO	10	10
16-bit processor	68000	Intel 8086	68000
Processor running speed	8MHz	4.77MHz	8MHz
RAM size	512K	256K	512K
Number of graphics modes	1	4	3
Number of colours	Monochrome	16	512
Max Screen Resolution (pixels)	512 x 342	640 x 256	640 x 400
Mouse included	Single Button	NO - extra £95	Two Button
Replaceable External Power Pack	NO	NO	YES
Cartridge Socket	NO	NO	YES
Joystick Ports	NO	NO	YES (two)
MIDI Synthesiser Interface	NO	NO	YES
Monitor Size	9"	9" - extra £200	12"
RGB Video Output	NO	YES	YES

System Cost with: Mouse - Monochrome Monitor - 512K RAM - 500K Disk Drive

Price of basic system (exc VAT)	£2595+VAT	£595+VAT	£652+VAT
+ Mouse	Included	£95+VAT	Included
+ Monochrome Monitor	Included	£200+VAT	Included
+ Expansion to 512K RAM	Included	£295+VAT	Included
Price of complete system (exc VAT)	£2595+VAT	£1185+VAT	£652+VAT
PRICE rounded down including VAT	**£2,984**	**£1,362**	**£749**

PRESS COMMENT

"Atari's new corporate image as an aggressive low cost computer maker is likely to mirror that of Commodore where Mr. Tramiel established the maxim that 'Business is war'."
August 21st 1984 **FINANCIAL TIMES**

"This is the only personal computer I know of that comes with a Midi interface as standard."
Peter Bright March 1985 **PERSONAL COMPUTER WORLD**

"The (GEM) version running on the Atari 68000 machines will have the additional advantage of leaving the PC version standing." April 6th 1985 **PERSONAL COMPUTER NEWS**

"It would seem that GEM offers the ideal operating system."
March 7th 1985 **POPULAR COMPUTING WEEKLY**

"I found it (GEM) extremely easy to use and was very impressed with the way in which it disguises the unfriendly hardware and operating systems lurking under the surface."
Peter Bright Feb 1985 **PERSONAL COMPUTER WORLD**

"The electronics in the machine are a work of art ... The heart of the 520ST is a Motorola 68000, one of the most powerful 16-bit processors around and in many respects it is close to being a 32-bit chip ... when the machine appears in the shops, I'll be at the front end of the queue to buy one."
Peter Bright June 1985 **PERSONAL COMPUTER WORLD**

"This machine is significantly more powerful than an IBM PC ... If it's possible to design a sure-fire winning machine, this is it."
May 11th 1985 **PERSONAL COMPUTER NEWS**

"... the use of GEM makes the new range of Atari computers so similar to the Macintosh (with the added attraction of colour), that they are already being called 'Jackintoshes'."
May 2nd 1985 **COMPUTING**

"The new Atari ST computers truly represent to the consumer what Jack Tramiel is saying — easy-to-use computing power without the price." March 1985 **ANALOG COMPUTING**

"It (the ST) uses the most modern technology that is affordable, in a package that gives a professional impression."
May 23rd 1985 **POPULAR COMPUTING WEEKLY**

"The Atari ST is one of the most elegant designs I have seen ... Atari has used an original and elegant method of memory management which should make the ST faster than any other PC on the market - in any price bracket ... The 64K dollar question is would I go out and spend money for one? To which the only answer is 'Try and stop me!'"
John Lambert July 1985 **ELECTRONICS & COMPUTING**

"The 520ST is technically excellent ... The 520ST hardware is the new standard by which others will be judged."
July 1985 **YOUR COMPUTER**

SILICA SHOP

ATARI

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At Silica we have been successfully dedicated to Atari ever since their products first appeared on the UK market. We can attribute our success largely to the Atari specialisation which we practice and to the user back-up we provide. Rest assured that when you buy a piece of Atari hardware at Silica you will be fully supported. Our mailings giving news of software releases and developments will keep you up to date with the Atari market and our technical support team and sales staff are at the end of the telephone line to deal with your problems and supply your every need. With our specialist bias, we aim to keep stocks of all the available Atari hardware, software, peripherals and accessories. We also stock a wide range of Atari dedicated books and through us, the owners on our list can subscribe to several American Atari dedicated magazines. We can provide a full service to all Atari owners and are now firmly established as the UK's NUMBER ONE Atari specialists. Here are just some of the things we can offer to our customers.

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SEND FOR FREE ATARI ST LITERATURE

To: Silica Shop Ltd, Dept PSIX 1085, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX

PLEASE SEND ME FREE LITERATURE

ON THE NEW ATARI 520ST COMPUTER

Mr/Mrs/Ms: .... Initials: .... Surname: ....

Address: ....

....

....

.... Postcode: ....

Do you already own a computer
If so, which one do you own? ....

In part 1 we discovered how to set up our own display list - now find out what you can do with it.

DISPLAY LISTS Pt.2

A tutorial by Steve Pedler

THE 'HIDDEN' GRAPHICS MODES

In the original 400/800 models, there were five graphics modes available in Antic which were not supported by the O.S. and BASIC. These were Antic modes 3,4,5, (text modes) 12 and 14 (graphics modes). With these machines, the only way to use these modes is to alter the display list, however, in the newer XL/XE models, four of these modes are available from BASIC. For this reason, I want to concentrate mainly on Antic 3, the only remaining 'hidden' mode.

Very briefly, Antic 4 and 5 are text modes in which characters can be made up from more than one colour (up to three colours per character, five colours on screen, including background). For a detailed discussion of these modes, see my article on the subject in issue 17 of Page 6.

Antic 12 and 14 are graphics modes using two and four colours respectively. The use of colour registers is identical to Graphics 6 (Antic 12) and Graphics 7 (Antic 14), but the advantage of these modes is increased vertical resolution (maximum vertical resolution=192 in full-screen mode). The combination of good resolution plus four colours has made Antic 14 (sometimes referred to as Graphics E or Graphics 7.5) a great favourite for drawing and painting programs such as Micropainter and AtariArtist.

Antic 3 is a fascinating mode because unlike all the other text modes it allows lowercase characters to be designed with true descenders (the bit that sticks below the line in the letters g, j, p, q, and y). This makes the text look much better and easier to read. I don't think I have ever seen this mode used in any commercial program, which seems a great pity as it would surely be ideal for text adventures.

Each mode line for Antic 3 is 10 scan lines high, the extra two scan lines being where the descender will go. This means that 19 lines of text can be displayed on the screen. The really interesting point however is how the machine displays 8 x 10 dot characters while each character is still defined in memory on an 8x8 grid. Listing 5 gives a demonstration with an unchanged character set.

Two points to note. Firstly, the lines of text are spaced slightly further apart due to the two extra scan lines. Secondly, the odd effect produced with certain lowercase characters, as though the top of the character has been cut off and put beneath it.

What happens is that when the hardware displays a character in the last quarter of the character set (and only the last quarter - which includes the lowercase characters and a few control characters) the first two bytes of the eight-byte character definition in memory are displayed underneath the character in those two extra scan lines. If those two bytes contain only zeroes then there is no problem, but the taller letters (b, d, h, etc.) have data in one of those bytes, which is then displayed under the character with the top of the letter being left blank. To design letters with true descenders, the data for the descender should therefore occupy these first two bytes. Figure 1 may explain this a little better.

To get around this problem of the tall letters, we could simply redefine them without the topmost dots. This however would make them look odd - 'h' tends to look rather like 'n'. A better way is to move the character set into RAM, displacing each character definition upwards in memory by one byte (so that byte 1 goes into the byte 2 position, byte 2 into byte 3 etc.). This has the effect of displaying each character one scan line lower on the screen but still leaves us two scan lines for the descenders. This means that the tall letters will not lose their tops. Listing 6 contains a BASIC subroutine to do this (lines 310-340) and then redefines the descender letters as in Figure 1.

Line 270 resolves a slight problem. The lowercase descen-

```
QW 5 REM ANTIC 3 DEMONSTRATION
LP 10 GRAPHICS 0
DF 20 SETCOLOR 2,2,8:SETCOLOR 1,2,0
HM 30 REM New Display List
OW 40 FOR J=0 TO 26:READ Z:POKE 1536+J,Z:
   NEXT J
MF 50 DATA 112,112,112,67,0,0,3,3,3,3,3,3
   ,3,3,3,3,3,3,3,3,3,3,3,3,65,0,6
EY 60 POKE 1540,PEEK(88):POKE 1541,PEEK(8
   9):POKE 559,0:POKE 560,0:POKE 561,6
LK 70 POKE 559,34
PQ 80 REM PRINT some examples
VT 90 POSITION 2,2:? "ATARI - ANTIC MODE
   THREE"
CI 100 ? "NOTE ADDED SPACE BETWEEN LINES"
IB 110 ? :? "a b c d e f g h i j k l m n
   o p q r s t u v w x y z"
GB 120 ? :? "Note that only lower case ch
   aracters are affected!"
NW 130 END
```

Listing 5

der letters (plus comma and semicolon) have data in the last byte of their character definition, which the above routine puts into the first byte of the following character. Line 270 puts zero into the appropriate character's first byte, thus avoiding the display of unwanted data. The only other problem is that certain characters (notably the ConTRoL graphics characters) have data in the last byte of their definitions. Moving this data means that these characters no longer display properly. I haven't bothered to correct this, other than for the comma and semicolon but if you want to use these characters, it is a simple matter to redefine them back to their correct shapes. Having redefined the descender characters, the program finally prints a silly message to show that it really works.

That, then is Antic 3. You could of course design other character sets, such as a Greek character set in this mode. Virtually any type of text is sure to look better. Remember that since the characters are still defined on an 8 x 8 grid basis, any character set editor can still be used. I think there is great potential in this mode, which has never been fully utilised.

PAGE FLIPPING

Page flipping is a technique whereby you can change the picture on the screen instantaneously, without having to clear it and redraw. It works by setting up two (or more) screens in RAM, then flipping between them simply by changing the display memory bytes in the DL. Listing 7 gives a very simple example of this.

As you see, the process is very simple. Line 30 first clears some memory - 2K, enough for two Graphics 0 screens. (The statement PRINT CHR$(125) can be used to clear any amount of memory between the memory location found in registers 88 and 89 and that in RAMTOP, location 106. For more information, see 'Mapping the Atari', page 19.) Lines 80 to 100 write to the first screen by directing screen and display memory pointers to it, and then alter the pointers and repeat the process for the second screen. Line 160 is the core of the page flip routine. The display memory locations in the DL are directed alternately to the two screens. By inserting additional LMS commands into the DL, you could flip only part of the screen while leaving the rest intact. Incidentally, you are not restricted to flipping between screens of the same mode, but if using different modes you must also change the DL. Try modifying the above example to flip between Graphics 0 and 1.

There is an additional rather fascinating possibility. What if we could flip very rapidly between the screens - say in every vertical blank interval? This would take place so rapidly that the two screens would appear superimposed. If the VBI routine also changed character sets or colour registers, it might allow you to construct Graphics 1 or 2 screens with 8 text colours, to print upper and lower case characters on the same screen in these modes, or to mix Graphics 0 text with a Graphics 8 display. To demonstrate that this really does work, add Listing 8 to the above example and re-run the program. Both screens will appear together, using a simple VBI routine to flip the pages. The assembler source code (Listing 9) is provided for anyone interested, and should be easily modifiable for your own purposes.

Those of you not familiar with assembly language can still

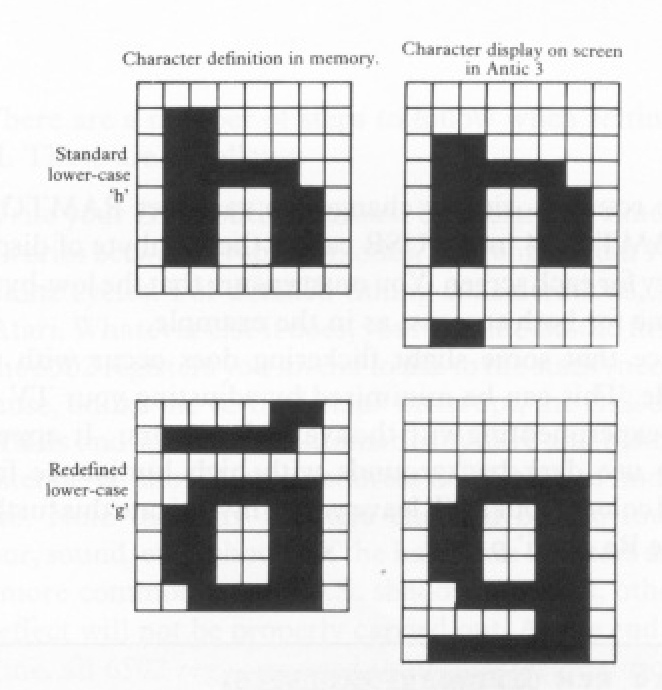


Figure 1. Character display and redefinition in Antic mode 3.

```
YQ 5 REM ANTIC MODE 3 - REVISED C/SET
NL 6 REM
FQ 10 REM Reserve space for new charset
VQ 20 RAMTOP=PEEK(106):POKE 106,RAMTOP-4:
   GRAPHICS 0
OV 30 FOR J=0 TO 26:READ Z:POKE 1536+J,Z:
   NEXT J
ME 40 DATA 112,112,112,67,0,0,3,3,3,3,3,3
   ,3,3,3,3,3,3,3,3,3,3,3,3,65,0,6
IP 50 REM Switch off ANTIC to speed thing
   s up
HW 60 POKE 559,0
DK 70 SETCOLOR 2,2,8:SETCOLOR 1,2,0
JG 80 GOSUB 310:GOSUB 150
PI 90 POKE 560,0:POKE 561,6:POKE 1540,PEE
   K(88):POKE 1541,PEEK(89):POKE 756,RAMT
   OP-4
QT 100 POKE 559,34
XX 110 REM Print message
SS 120 ? :?
PG 130 ? "True descenders now implemented
    - good job done post-haste without qu
   andary!"
NY 140 END
SB 150 REM Data for new charset
RM 160 OURCHAR=(RAMTOP-4)*256
AF 170 FOR J=1 TO 7:READ OFFSET:FOR X=0 T
   O 7:READ CHARDAT
DT 180 POKE OURCHAR+OFFSET*8+X,CHARDAT:NE
   XT X
GT 190 NEXT J
OJ 200 DATA 103,6,124,0,62,102,102,102,62
YW 210 DATA 106,6,60,6,0,6,6,6,6
MY 220 DATA 112,96,96,0,124,102,102,102,1
   24
FM 230 DATA 113,6,6,0,62,102,102,102,62
FN 240 DATA 121,12,56,0,102,102,102,102,6
   2
QL 250 DATA 27,0,0,24,24,0,24,24,48
SK 260 DATA 12,0,0,0,0,0,24,24,48
EJ 270 FOR J=1 TO 6:READ OFFSET:POKE OURC
   HAR+(OFFSET*8),0:NEXT J
DQ 280 DATA 13,28,104,107,114,122
ZQ 290 RETURN
HO 300 REM move charset
VE 310 REM Move charset
UY 320 OLDCHAR=PEEK(756)*256:OURCHAR=(RAM
   TOP-4)*256
NA 330 FOR J=0 TO 1022:POKE OURCHAR+J+1,P
   EEK((OLDCHAR+J)):NEXT J
ZH 340 RETURN
```

Listing 6

use the routine - simply change the variables RAMTOP-8 and RAMTOP-4 in the USR call to the highbyte of display memory for each screen. You must ensure that the low-byte is the same for both screens, as in the example.

Notice that some slight flickering does occur with this example. This can be minimised by adjusting your TV set, and by experimenting with the available colours. It appears best to use dark backgrounds with high luminance foreground colours, but I will leave you to investigate this further. See 'De Re Atari' p.2-10.

```
JJ 10 REM Page flip (BASIC)
KX 20 REM Reserve and clear memory for tw
   o screens
TY 30 RAMTOP=PEEK(106):POKE 88,0:POKE 89,
   RAMTOP-8:? CHR$(125)
WI 40 POKE 106,RAMTOP-8
BN 50 GRAPHICS 0:POKE 752,1
VX 60 SETCOLOR 2,13,2:SETCOLOR 1,13,12
SZ 70 DL=PEEK(560)+256*PEEK(561)
DB 80 REM Write to first page
MA 90 POKE 88,0:POKE 89,RAMTOP-8:POKE DL+
   4,0:POKE DL+5,RAMTOP-8
CN 100 POSITION 2,11:? "This is the first
    page..."
GQ 110 FOR T=1 TO 250:NEXT T
ZN 120 REM Now write to second page
AQ 130 POKE 89,RAMTOP-4:POKE DL+5,RAMTOP-
   4
PF 140 POSITION 2,12:? "...and this is th
   e second!"
LY 150 REM Page flip routine follows
RL 160 FOR T=1 TO 250:NEXT T:POKE DL+5,RA
   MTOP-8:FOR T=1 TO 250:NEXT T:POKE DL+5
   ,RAMTOP-4:GOTO 160
NA 170 REM Press SYSTEM RESET to stop
```

Listing 7

```
JJ 10 REM Page flip (BASIC)
KX 20 REM Reserve and clear memory for tw
   o screens
TY 30 RAMTOP=PEEK(106):POKE 88,0:POKE 89,
   RAMTOP-8:? CHR$(125)
WI 40 POKE 106,RAMTOP-8
BN 50 GRAPHICS 0:POKE 752,1
SB 55 GOSUB 180
VX 60 SETCOLOR 2,13,2:SETCOLOR 1,13,12
SZ 70 DL=PEEK(560)+256*PEEK(561)
DB 80 REM Write to first page
MA 90 POKE 88,0:POKE 89,RAMTOP-8:POKE DL+
   4,0:POKE DL+5,RAMTOP-8
CN 100 POSITION 2,11:? "This is the first
    page..."
GQ 110 FOR T=1 TO 250:NEXT T
ZN 120 REM Now write to second page
AQ 130 POKE 89,RAMTOP-4:POKE DL+5,RAMTOP-
   4
PF 140 POSITION 2,12:? "...and this is th
   e second!"
MD 150 REM VBI routine call follows
MN 160 X=USR(1536,RAMTOP-8,RAMTOP-4)
RD 165 GOTO 165
NA 170 REM Press SYSTEM RESET to stop
YF 180 REM Data for VBI
TC 190 RESTORE 220
OY 200 FOR J=0 TO 67:READ X:POKE 1536+J,X
   :NEXT J
ZA 210 RETURN
GQ 220 DATA 104,104,104,141,66,6,104,104,
   141,67,6,169,0,133,203,173,48,2,133,20
   4
UF 230 DATA 173,49,2,133,205,169,6,162,6,
   160,35,32,92,228,96,24,165,203,105,1
ME 240 DATA 133,203,41,1,208,10,173,67,6,
   160,5,145,204,76,63,6,173,66,6,160
ZD 250 DATA 5,145,204,76,95,228,0,0
```

Listing 8

```
10   *=$0600
20 ;equates
30 SYSVBV=$E45F
40 COUNT=$CB
50 DLLOW=$CC
60 DLHIGH=$CD
70 SDLSTL=$230
80 SETVBV=$E45C
90 ;set up for vbi
0100   PLA ;no. of args
0110   PLA ;discard hi-byte of 1st arg.
0120   PLA ;1st. page
0130   STA PAGE1
0140   PLA ;discard hi-byte of 2nd arg.
0150   PLA ;2nd. page
0160   STA PAGE2
0170   LDA #00
0180   STA COUNT ;set counter to zero
0190   LDA SDLSTL ;lo-byte of display list
0200   STA DLLOW
0210   LDA SDLSTL+1 ;hi-byte of display li
   st
0220   STA DLHIGH
0230   LDA #6 ;immediate vbi
0240   LDX #VBROUT/256
0250   LDY #VBROUT&255
0260   JSR SETVBV
0270   RTS
0280 VBROUT
0290   CLC
0300   LDA COUNT
0310   ADC #1 ;add 1 to counter
0320   STA COUNT
0330   AND #1
0340   BNE PAG1 ;show page 1 or 2?
0350 ;change page
0360 PAG2
0370   LDA PAGE2
0380   LDY #5
0390   STA (DLLOW),Y ;hi-byte of screen me
   mory for page 2
0400   JMP EXIT ;back to O.S.
0410 PAG1
0420   LDA PAGE1
0430   LDY #5
0440   STA (DLLOW),Y ;hi-byte of screen me
   mory for page 1
0450 EXIT
0460   JMP SYSVBV
0470 PAGE1   .BYTE 0 ;reserved space
0480 PAGE2   .BYTE 0 ; for hi-bytes of the
   two pages
0490   .END
```

Listing 9

THE DISPLAY LIST INTERRUPT

The Display List Interrupt is a highly advanced feature found on few other personal computers even today - not bad for a machine first designed in 1979! The DLI really needs an article all to itself, but hopefully this will provide enough of the basic information to get you started. For an extensive discussion, see 'De Re Atari', chapter five.

The idea behind the DLI is that when Antic finds a DLI instruction in the DL, the 6502 main processor is forced to stop what ever it is doing and carry out a short machine language routine supplied by the user. Unfortunately, due to timing considerations, there is no way of knowing exactly when on a given mode line the desired effect would actually take place. For example, a colour change could occur partway along a mode line - and exactly where this change occurred might vary each time the DLI was called. There is a solution however. Storing any number into register 54282 (WSYNC; D40A hex) forces the microprocessor to wait until the horizontal blank period before carrying out the required changes. Any changes will therefore appear on the line below that carrying the DLI instruction.

What sort of things can you do? Your routine must be short, and therefore changes are limited, but you can change colour registers, alter other graphics registers such as the character base register, create sound effects and manipulate player-missile graphics. Some examples are given below.

```
PX 10 REM DLI Example 1
OP 20 REM POKE routine into page 6
FY 30 FOR J=0 TO 10:READ X:POKE 1536+J,X:
   NEXT J
TT 40 POKE 512,0:POKE 513,6
NF 50 GRAPHICS 0:SETCOLOR 1,0,0:SETCOLOR
   2,8,10
SY 60 DL=PEEK(560)+256*PEEK(561)
TN 70 REM Modify DL to call the DLI
FP 80 POKE DL+15,130
CX 90 POKE 54286,192
RS 100 LIST
NZ 110 REM DLI data
UA 120 DATA 72,169,252,141,10,212,141,24,
   208,104,64
```

Listing 10

```
QR 10 REM DLI Example 2
LQ 20 GRAPHICS 0
HE 30 FOR J=0 TO 12:READ X:POKE 1536+J,X:
   NEXT J
SE 40 REM Initialise POKEY
NW 50 POKE 53768,0:POKE 53775,3
BW 60 POKE 53761,166
TH 70 REM Set up to call DLI
CL 80 POKE 203,0
TY 90 POKE 512,0:POKE 513,6
FL 100 DL=PEEK(560)+256*PEEK(561)
RO 110 POKE DL+15,130
OH 120 POKE 54286,192
XJ 130 ? "KPress OPTION for silence!"
TA 140 IF PEEK(53279)<>3 THEN 140
OA 150 END
XS 160 DATA 72,165,203,141,10,212,141,0,2
   10,230,203,104,64
```

Listing 11

There are a number of steps to follow when setting up a DLI. These are as follows:

1) Write your DLI routine. It must be short. The time available varies between graphics modes, but ranges from 14 to 61 machine cycles. For detailed timing considerations, see De Re Atari. Whatever else it does, your routine should first save all the 6502 registers you intend to use to the stack (necessary because, unlike the vertical blank interrupt, the O.S. doesn't use DLIs and so does not automatically save and restore the registers). It should then address WSYNC as indicated above. Note that any registers changed by the routine - colour, sound, etc. - should be the hardware registers and not the more commonly used O.S. shadow registers, otherwise the effect will not be properly carried out. At the end of the routine, all 6502 registers used should be restored from the stack and the routine should end with the Return from Interrupt (RTI) instruction.

2) Place the routine into a protected memory area such as page six.

3) Put the starting address of your DLI routine, in low- and high-byte format, into the DLI vector location at 512, 513 (200,201 hex; VDSLST). Note that there is only one vector, and if you intend to use multiple DLIs then each DLI should modify the vector to point to the next routine.

4) Modify the DL to call the DLI. To do this, add 128 (i.e. set bit seven) to the mode line instruction of the line *before* the line on which you wish the change to appear (see the discussion above for the reason for this). Note that this means that you cannot use a DLI to alter the first mode line of any screen.

5) Finally, enable DLIs by POKEing location 54286 (NMIEN; D40E hex) with 192. DLIs are disabled on power-up and System Reset.

Listings 10 to 12 are three examples of DLIs. The assember source code is also given (Listings 13 to 15) and should be fairly self-explanatory. The first example is probably the simplest possible DLI, it changes the lower part of the screen to yellow. The top part remains blue because during the vertical blank period the O.S. reads the RAM shadow register (not changed by the DLI - hence the reason for addressing the hardware registers) and puts the contents back into the hardware register. When you have this running, try pressing a few keys. You will see that occasionally a keypress is accompanied by a 'glitch' on the screen. This occurs because the O.S. keyclick routine also addresses WSYNC and in doing so interferes with the timing of the DLI. There isn't much you can do about this, except not to allow input from the keyboard in your program! I understand that XL owners can disable the keyclick with a POKE 731,255 (do a POKE 731,0 to turn it on again). You might like to try this and see if if works. (400/800 owners like myself needn't bother, 731 is a merely a spare byte in our machines.) I have tried the NOCLICK routine from Page 6 library disk no. 20 and this does appear to prevent the problem.

The second example is one of sound generation using a DLI. The advantages of this method are that your main program continues to run independently of the sound effect. Certainly, you could do the same thing using a VBI routine, but you can turn off a DLI sound effect by removing the DLI

DISPLAY LISTS continued

```
RL 10 REM DLI Example 3
JZ 20 DIM OFFSET(5)
HI 30 REM Reserve area for PMG and draw
   foreground
JS 40 RAMTOP=PEEK(106):POKE 106,RAMTOP-4:
   GRAPHICS 3+16:PMMEM=RAMTOP-4
IR 50 SETCOLOR 0,15,10:SETCOLOR 2,2,6:COL
   OR 1
OY 60 PLOT 0,0:DRAWTO 39,0:DRAWTO 39,23:D
   RAWTO 0,23:DRAWTO 0,0:PLOT 20,1:DRAWTO
    20,22:PLOT 21,22:DRAWTO 21,1
BH 70 COLOR 3:PLOT 10,1:DRAWTO 10,22:PLOT
    11,22:DRAWTO 11,1:PLOT 30,1:DRAWTO 30
   ,22:PLOT 31,22:DRAWTO 31,1
XB 80 REM Set up PMG
XP 90 FOR J=0 TO 1023:POKE PMMEM*256+J,0:
   NEXT J
RW 100 FOR J=0 TO 5:READ BYTE:OFFSET(J)=B
   YTE:NEXT J
GJ 110 DATA 31,46,61,76,91,105
OE 120 FOR J=0 TO 5:FOR X=0 TO 6:READ BYT
   E:POKE PMMEM*256+512+OFFSET(J)+X,BYTE:
   NEXT X
HB 130 RESTORE 140:NEXT J
GE 140 DATA 96,112,254,115,254,112,96
UD 150 POKE 54279,PMMEM
VW 160 POKE 53277,3:POKE 559,46
OT 170 POKE 623,1:POKE 53248,127:POKE 704
   ,14:POKE 53256,0
QW 180 POKE 203,0:POKE 204,127
SE 190 REM POKE in the VBI routine
UC 200 GOSUB 450
HX 210 FOR T=1 TO 6000:NEXT T
FM 220 REM Set up for the DLI
TM 230 GOSUB 250
NR 240 GOTO 240
OI 250 REM DLI data
WD 260 RESTORE 280
OV 270 FOR J=0 TO 66:READ X:POKE 1536+J,X
   :NEXT J
OU 280 DATA 72,138,72,8,166,203,165,204,2
   4,125,43,6,141,10,212,141,0,208,189,49
TQ 290 DATA 6,141,18,208,189,55,6,141,8,2
   08,189,61,6,141,27,208,230,203,40,104
KK 300 DATA 170,104,64
VC 310 REM Position offset table
AK 320 DATA 30,50,150,175,75,10
JR 330 REM Colour table
PW 340 DATA 14,170,204,74,136,86
YA 350 REM Size table
EZ 360 DATA 1,0,1,3,0,1
NO 370 REM Priority table
OZ 380 DATA 1,8,1,4,8,1
WF 390 POKE 512,0:POKE 513,6
FO 400 DL=PEEK(560)+256*PEEK(561)
LY 410 FOR J=1 TO 6:READ LINE:POKE DL+LIN
   E,136:NEXT J
AG 420 DATA 6,10,14,18,22,25
OM 430 POKE 54286,192
ZI 440 RETURN
QU 450 REM VBI data
XF 460 RESTORE 480
NN 470 FOR J=0 TO 33:READ X:POKE 1664+J,X
   :NEXT J
CL 480 DATA 104,169,7,160,139,162,6,32,92
   ,228,96,169,0,133,203,141,8,208,165,20
LA 490 DATA 41,1,208,7,230,204,165,204,14
   1,0,208,76,98,228
DS 500 X=USR(1664)
ZD 510 RETURN
```

Listing 12

```
10  *=$0600
20 ;equates
30 WSYNC=$D40A ;sync register
40 COLPF2=$D018 ;background colour
50 ;dli service routine
60  PHA ;save accumulator
70  LDA #$FC ;new colour (yellow)
80  STA WSYNC ;wait for horizontal sync
90  STA COLPF2 ;do the new colour
0100  PLA ;restore accumulator
0110  RTI ;return control to processor
0120  .END
```

Listing 13

```
10  *=$0600
20 ;equates
30 WSYNC=$D40A
40 AUDF1=$D200 ;audio frequency #1
50 COUNTER=$CB ;temporary counter
60 ;dli service routine
70  PHA ;save accumulator
80  LDA COUNTER ;get frequency
90  STA WSYNC ;wait for horizontal sync
0100  STA AUDF1 ;change frequency
0110  INC COUNTER ;increase the frequency
 counter
0120  PLA ;restore accumulator
0130  RTI ;return control to processor
0140  .END
```

Listing 14

```
10  *=$0600
20 ;equates
30 HPOSP0=$D000 ;horiz. position register
 , player zero
40 OFFSET=$CB ;offset counter into tables
50 SIZEP0=$D008 ;size of player zero
60 COLP0=$D012 ;colour of player zero
70 WSYNC=$D40A
80 PRIOR=$D01B ;priority register
90 POSTEMP=$CC ;temporary position counte
r
0100  PHA ;save accumulator
0110  TXA ;save x-register
0120  PHA
0130  PHP ;save status register
0140  LDX OFFSET ;get the offset into the
 tables
0150  LDA POSTEMP ;temporary position cou
nter
0160  CLC ;clear carry
0170  ADC POSTAB,X ;add the position valu
e
0180  STA WSYNC ;wait for horizontal sync
0190  STA HPOSP0 ;do the new position
0200  LDA COLTAB,X ;get the new colour
0210  STA COLP0 ;and carry it out
0220  LDA SIZTAB,X ;get the new size
0230  STA SIZEP0 ;and carry it out
0240  LDA PRIORTAB,X ;get the new priorit
y
0250  STA PRIOR ;and do it
0260  INC OFFSET ;increase the offset
0270  PLP ;restore processor status
0280  PLA
0290  TAX ;restore x-register
0300  PLA ;restore accumulator
0310  RTI ;return control to processor
0320 ;value tables follow
0330 POSTAB .BYTE 30,50,150,175,75,10
0340 COLTAB .BYTE 14,170,204,74,136,86
0350 SIZTAB .BYTE 1,0,1,3,0,1
0360 PRIORTAB .BYTE 1,8,1,4,8,1
0370  .END
```

Listing 15

instruction from the DL, or more simply by disabling DLIs (POKE NMIEN with 64). Do this with a VBI and you turn off the O.S. vertical blank routine as well! The demonstration addresses the sound registers directly; for more information on this, see 'Mapping the Atari' pp. 121-125. The loop in line 140 is necessary because coming to the end of a BASIC program - or the keyword END - turns off the sound. However, pressing Break or the keyword STOP do not (try it and see).

The last example demonstrates the possibilities of using a DLI to enhance player-missile graphics. Believe it or not, the effect that is shown is achieved by using just one player and one DLI. The way it works is that the player image data is first read into six different areas in the player-0 memory map (corresponding to six vertical positions on the screen) and the DLI code set on six DL mode lines. The DLI is table driven and each time it is called changes the colour, size, horizontal position and priority registers. A simple VBI routine is used to move the player horizontally (source code in Listing 16). In this third example, there is an inbuilt delay (line 210) to show you the effect before the DLI is enabled. Because the DLI is table driven, you can experiment with it and see what effects are produced. The four tables are in lines 310-380 and can all be altered. The position table is not one of absolute positions, but of offsets from the horizontal position stored temporarily in location 204, and then put into the player-0 position register at 53248. ●

Next issue, in the concluding part of this series, Steve Pedler looks at some advanced uses of the Display List including scrolling.

```
10   *=$0680
20  ;equates
30  HPOSP0=$D000
40  SETVBV=$E45C
50  XITVBV=$E462 ;vbi exit vector
60  POSTEMP=$CC ;temporary position counte
r
70  TIMER=$14 ;internal realtime clock
80  OFFSET=$CB ;offset into tables
90  SIZEP0=$D008
0100 ;initialize vbi
0110   PLA ;number of arguments
0120   LDA #7 ;deferred vbi
0130   LDY #VBROUT&255 ;lo-byte
0140   LDX #VBROUT/256 ;hi-byte
0150   JSR SETVBV ;enable vbi
0160   RTS ;back to BASIC
0170 VBROUT ;start of vbi routine
0180   LDA #0
0190   STA OFFSET ;reset offset counter
0200   STA SIZEP0 ;and size register
0210 ;colour and priority are reset by sy
  stem vb routine from shadow register
0220   LDA TIMER
0230   AND #1 ;slow things down a bit
0240 ;move by one colour clock every   ot
  her jiffy
0250   BNE EXIT
0260   INC POSTEMP ;increase the temporary
   position counter
0270   LDA POSTEMP
0280   STA HPOSP0 ;and store it in positio
  n register
0290 EXIT
0300   JMP XITVBV
0310   .END
```

Listing 16



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WE HAVE MOVED!

SECTOR 10

by Geoff Thompson

Sector 10 is the main energy supply unit for this colony with seven power batteries tapped directly into the core of Celsis 5. As sector guardian you must make regular patrols in your vector fighter to guard against intruders. Although the subversives on Celsis 5 are under control, the nearby planet of Eldon has an energy problem and there are growing reports from off-planet intelligence that they may make an attempt at penetrating Sector 10.

Suddenly, without warning, an Eldon cruiser descends swiftly towards power battery five, then another and another! You *must* destroy them for if they manage to drain energy from all seven batteries, the core of Celsis 5 will become unstable and the planet will explode. Having wiped out that first attack wave you may sit back thinking your mission is completed but the Eldons come again, this time with supporting defence ships. Whilst no match for your fighter you might be outweighed by sheer numbers. For the Eldons, it is a suicide mission, they may as well die here as at home, but you have no wish to die and neither have the thousands on Celsis 5 who depend on Sector 10 to supply their energy. It will be a long fight.

Sector 10 is played by one player with the joystick. A bonus ship is awarded after 10,000 points. The space bar pauses the action and moving the joystick will resume play.

TYPING IT IN

Cassette and disk users should type in listing 1. SAVE or CSAVE a copy, then RUN the program. Answer the cassette/disk question accordingly and the program will then check each line of data and create a boot tape or disk version. To load the boot tape, remove all cartridges then turn on the computer while holding down the START key. Disk users should type in Listing 2 and save with whatever filename you wish on the same disk as "SECTOR.DAT". You can then RUN the program by typing RUN "d:(your filename)".

Sector 10 will only run on 48k or 64k systems.

```
MF 5 REM SECTOR 10 LOADER
OO 10 OPEN #1,4,0,"D:SECTOR.DAT"
IL 20 POKE 850,7
VD 30 POKE 852,0:POKE 853,32
RO 40 POKE 856,255:POKE 857,255
SO 50 X=USR(ADR("hhh*LVd"),16)
FT 60 CLOSE #1:X=USR(8192)
```

Listing 2

```
CS 1 REM ##################################
JA 2 REM #          SECTOR 10             #
ZV 3 REM #              by                #
NH 4 REM #         Geoff Thompson         #
SG 5 REM # ------------------------------ #
XD 6 REM #  PAGE 6 MAGAZINE - ENGLAND     #
CY 7 REM ##################################
NN 8 REM
ZP 9 REM ____ LOADER ROUTINE FROM ____
              ANALOG MAGAZINE
MF 10 POKE 710,0:POKE 752,1:? CHR$(125):P
   OSITION 15,2:? "SECTOR 10"
BV 12 FOR I=0 TO 255:POKE 709,I:A=8/8:NEX
   T I:? CHR$(125)
EG 15 DATA 0,1,2,3,4,5,6,7,8,9,0,0,0,0,0,
   0,0,10,11,12,13,14,15
LZ 20 TRAP 20:? :? "Cassette (0) or Disk
   (1) version.";:INPUT DISK:IF DISK>1 OR
    DSK<0 THEN 20
SQ 30 DIM HEX$(91),Y$(1),HEX(22):FOR X=0
   TO 22:READ N:HEX(X)=N:NEXT X:LINE=990:
   TRAP 110
QO 40 ? :? " Please wait, checking data."
   :RESTORE 1000
VB 50 TOTAL=0:LINE=LINE+10:? "   LINE:";L
   INE:READ HEX$:IF LEN(HEX$)<>90 THEN 20
   0
PJ 60 NXTLIN=PEEK(183)+256*PEEK(184):IF N
   XTLIN<>LINE THEN ? :? "LINE ";LINE;" M
   ISSING!":END
AC 70 FOR X=1 TO 89 STEP 2:D1=ASC(HEX$(X,
   X))-48:D2=ASC(HEX$(X+1,X+1))-48:BYTE=H
   EX(D1)*16+HEX(D2)
YU 75 IF PASS=2 THEN PUT #1,BYTE:NEXT X:R
   EAD CHK:GOTO 50
JI 80 TOTAL=TOTAL+BYTE:NEXT X:READ CHK:IF
    TOTAL=CHK THEN 50
MH 90 GOTO 200
XN 110 IF PEEK(195)<>6 THEN 200
DT 120 IF PASS=0 THEN 160
ZG 130 IF  NOT DISK THEN 150
IF 140 CLOSE #1:END
XJ 150 FOR X=1 TO 106:PUT #1,0:NEXT X:CLO
   SE #1:END
BI 160 IF  NOT DISK THEN 170
VQ 165 ? :? "Insert disk, press RETURN.";
   :INPUT Y$:OPEN #1,8,0,"D:SECTOR.DAT":G
   OTO 190
JV 170 ? "Prepare cassette and press RETU
   RN.";:OPEN #1,8,128,"C:":RESTORE 210
WY 180 FOR X=1 TO 40:READ HED:PUT #1,HED:
   NEXT X
OZ 190 ? :? "WRITING FILE":PASS=2:LINE=99
   0:RESTORE 1000:TRAP 110:GOTO 50
BX 200 ? "BAD DATA!":END
GA 210 DATA 0,62,216,31,255,31,169,34,141
   ,47,2,169,60,141,2,211,169,0,141,231,2
   ,133,14,169,56,141,232,2
CT 220 DATA 133,15,169,0,133,10,169,32,13
   3,11,24,96
```

```
RH 1000 DATA 2065E42031272047 27A202BD0924
   9DC402CA10F7A911186D347AA2619D4B21A900
   8DFF238D0024AD347A8D007A,4245
WM 1010 DATA A9388DF402A9288D3002A9218D31
   02203127A907A220A068205CE4A9078D08D2A9
   AF8D01D28D05D2A9C08D0ED4,4827
NN 1020 DATA A9008D1FD0202824203C244C5F20
   A9A88D0002A9208D0102A9008D0024AD1C02F0
   034C62E4AEFF23BD0C218D00,3846
BG 1030 DATA D2AAE88E04D2AEFF23BD0C248D1C
   02EEFF23ADFF23C91CD005A9008DFF234C62E4
   488A48EE0024A207AD0BD465,5497
FH 1040 DATA 148D0AD48D19D0CAD0F2AD0024C9
   0BD00AA9D38D0002A9208D010268AA6840488A
   48A9E08D0AD48D09D4A203BD,5112
UL 1050 DATA 01249D16D0CA10F7A9F78D0002A9
   208D010268AA6840488A488D0AD4A203BD0524
   9D16D0CA10F768AA6840B690,4895
EI 1060 DATA A2C1B690A2C1B6C1D9C1B6A29079
   80A2907980A290A2B6C1D9F3707070C4AF2184
   8484848484848484840470F0,6832
WE 1070 DATA 464B217006703086704006600641
   28210000627900A7A5AFA6A600B4A8AFADB0B3
   AFAE0000666F720030212725,3954
GO 1080 DATA 0016002D2127213A292E250000E8
   E9E7E800F3E3EFF2E59A101010101010000000
   F3F4E1F2F40D00626567696E,4440
II 1090 DATA 0067616D650000000000B3A5ACA5
   A3B40D0077617665000000004 44A4A4A4A4A4A
   4A4A4A4A4A4A4A4A4A4A4A4A,3282
BC 1100 DATA 4A4A4A4A4A4A4A4A4A4A4A4A4A4A
   4A4A4A4A4A4A4749000000810000820000000083
   000000000000820000000081,2273
FZ 1110 DATA 0000830000000000000082000000 81
   00484900000083000000000083000000008100
   000000000000830000000000,1057
WW 1120 DATA 8100000000008200000048490000
   83000004050607000C0D0E0F0014151617001C
   1D1E1F0024252627002C2D2E,1100
DG 1130 DATA 2F000082004849810000000 00809
   0A0B00101112130018191A1B00202122230028
   292A2B003031323300000000,1159
LD 1140 DATA 4849000000008100000000008300
   00000000008100000000008300000000810000
   000000000083004849000081,1199
GK 1150 DATA 0000000000000000000083000000
   00000081000000000083000000008300000000
   008148490000008300000000,927
GA 1160 DATA 0000810000830034353637003C3D
   3E3F00000081000000000083000081004849 00
   000000000083000081000000,1514
MP 1170 DATA 000038393A3B0040414243000000
   83000000008100000000004849008100000000
   830000000081000000830000,1417
VM 1180 DATA 0000008100000000000000830000
   00810000008148490000000081000000000000
   830000008300008100008300,1314
SM 1190 DATA 0000810000000000830000008100
   0048454B4B4B4B4B4B4B4B4B4B4B4B4B4B4B4B
   4B4B4B4B4B4B4B4B4B4B4B4B,2630
OX 1200 DATA 4B4B4B4B4B4B4B4B4B4B46707070
   46D7232006C054008154008254008354008454
   008554008654008754008854,3522
IU 1210 DATA 008954008A54008B54008C54008D
   54008E54008F54009054009154009254009354
   0094418F23B3A3AFB2A51A00,3763
JY 1220 DATA 00000000000000000651A00000000
   F7E1F6E51A00000073686970731A0000000000
   0C9D5418B6766AD6161896C6,2968
QA 1230 DATA 38501E1E1E501E1E1E1E1E1E1E1E
   1E5019191950191919501E1E1E1E64AD1FD029
   01F00160AD1FD02901F0F968,3024
PI 1240 DATA 684C8824AD1FD02902D026EE007A
   AD007AC909D005A9008D007AA261AD007A1869
   119D4B21AD1FD02902F0F9A9,4641
LE 1250 DATA 008D1FD060488A48A93C8D0AD48D
   09D4A203BD84249D16D0CA10F768AA68400000
   0046A9E08DF402A9008D07D4,4907
LG 1260 DATA A93E8D2F02A9038D1DD08D047A8D
   317AAD007A8D347AA907A231A016205CE4A9C0
   8D0ED4A96A8D0002A9248D01,4574
ND 1270 DATA 02A9058D0CD0A9008D08D08D09D0
   8D0AD08D0BD0854D8D337A8D437AA9118D327A
   A20BA9109DD723CAE005D0F8,5145
UJ 1280 DATA A913A2259DD723A9018D6F02A98F
   8D3002A9238D3102EE007AAD007AC91FD003CE
   007A20312720472720E12DA9,4276
QM 1290 DATA 008D08D2A26E9D447ACAD0FAA200
   AD0AD229F009049D842409084930A2029D8424
   AD0AD229F0090ACA9D8424A9,4828
HU 1300 DATA 018D3F7AAD3F7AD0FBAD007AC902
   B00CAD007A8D017AEE017A4C6725A9048D017A
   AD007AC90DB018AE007ABDE0,4821
MW 1310 DATA 268D467ABDFC268D387ABDEE268D
   397A4C9525A9038D467AA9028D387AA9058D39
   7AAD007A0A1869058D457AA0,4636
ZL 1320 DATA 0084B0A99485B1205726C8C0D4D0
   F8A000A99385B1AD0AD229E0F0062057264CC6
   25A90091B0C8C0D4D0EAA200,6008
TF 1330 DATA 8AA8BC0A2788A90091B0C891B0C8
   91B0C891B0E8E007D0E8A99285B1A000AD0AD2
   2980F010E6B1B1B048C6B168,6549
QJ 1340 DATA F0062057264C0626A90091B0C8C0
   D4D0E0C6B1A5B1C98FF0034CE925A99485B120
   3C26A99385B1203C26A99285,5660
NJ 1350 DATA B1203C26A99185B1203C26A99085
   B1203C264C5627A2D4A000B1B08E477AAC477A
   91B0E8C8D001609838E9D4A8,5481
PW 1360 DATA 4C4026AD0AD22903AABDDC2691B0
   60A200A99385B1BD0A27A8BD497AD034AD267A
   F008AD487AF01E4C8E26A916,5152
VV 1370 DATA 8D267AAD487A49018D487AF00CA9
   1C91B0C8A91D91B04CAF26A91A91B0C8A91B91
   B04CAF26A90F91B0C8A90E91,5410
OZ 1380 DATA B0E8E007D0B160EE507AAE027ACE
   507AAD507AD00160BDD723C919F00869019DD7
   234CB826A9109DD723CA4CC4,5736
HP 1390 DATA 26010203040F0E0E0C0B0A090807
   06050403030C0C0C0C0C090909090907070707
   050505050505040404040303,357
UZ 1400 DATA 03022C3A5B6DA5C4D28586878889
   8A8B8C00FC6078387FFEFF7F1C7E0000000000
   0008844C9F000000A900AA9D,4282
YO 1410 DATA 00039D00049D00059D00069D0007
   CAD0EE60A9008D01D28D03D28D05D28D07D260
   206326AD007A8D507AA910A2,4236
LW 1420 DATA 1A9DD723E89DD7238E027A20B526
   A910A2119DD723E89DD723AD457A8D507A8E02
   7A20B526AD437AD07BA21AA0,5264
MV 1430 DATA 1BBDD723990089E8C8BDD7239900
   89A011A200BD1127990089C8E8E008D0F4A9AF
   8D01D2A9A78D03D2A9A58D05,5773
DS 1440 DATA D2A9A38D07D2A209A0968C00D298
   1869148D02D21869148D04D21869148D06D28E
   477A8C277AA202A00088D0FD,4952
JM 1450 DATA CAD0FAAE477AAC277A88D0D1CAD0
   CC204727A900A011990089C8C01DD0F8A9008D
   437AA07C8C527AA9AA8D01D2,6000
LD 1460 DATA A9788D00D08D517AA97C8D01D0A9
   0F8DC0028DC102A9078D477AA200B900040D0A
   D23D1927990004B900050D0A,4069
QE 1470 DATA D23D2527990005A9038D1C02AD0A
   D2291F8D00D2ADC002490C8DC0028DC102AD1C
   02D0FBC8E8E00CD0C5A200AC,4856
PT 1480 DATA 527ACE477AD0BBA9008D01D2A9B6
   8DC002203127A9388DC102A2008E567A8E537A
   86B486B68E407A8E037A8E9B,5267
HY 1490 DATA 7A8E3D7A8E297A8E2A7A8EAC7A8E
   1ED0BD2E348D287A8E047AAD297AD0FB20EF30
   20632620082920FD2820CA29,4696
JQ 1500 DATA 202E2EEE9B7A202E2EEE9B7A202E
   2EA9008D9B7A209829 20032E20972B20572C8D
   1ED0ADAC7AF0034C732CAD40,4245
TD 1510 DATA 7AF0BC4C0225A201A0F488D0FDCA
   D0FA60AD087AF0034C6429AD8402CD097AF00A
   8D097AC900D0034C232960A9,5342
```

```
XC 1520 DATA 00854DA9068D077AAD537A8D587A
   F00CAD517A38E9048D597A4C4929AD517A1869
   058D597A8D04D0AD527A1869,4568
DF 1530 DATA 088D5A7AA8B900030901990003A9
   018D087A60AC5A7AB900030903990003AD587A
   F006CE597A4C7D29EE597AAD,4070
GS 1540 DATA 597A8D04D0C928D009A9008D087A
   20183560AD597AC9D3F0F060A202BD0D302D08
   D0D004CA10F560A9019D9C7A,5090
RW 1550 DATA A9DC8D057AA90A8D067AA9008D08
   7A2018354CA229A900AA9D0004CAD0FA60A900
   8D5B7AAE5B7A20E029EE5B7A,4847
AQ 1560 DATA AD5B7AC907D0F060BD5C7AD0034C
   5A2ABD637AD014A9059D0A7A9D637A20342ABD
   6A7A0AAA20432A60BD0A7AF0,4960
VO 1570 DATA 0160A9009D637A9D5C7A9D787A9D
   947A9D8D7ACE037ACE457A20342AA210204 32A
   A9018D507AA90A8D027A20B5,4604
QK 1580 DATA 2660BD7F7A85B5BD867A85B7BD0A
   27A860BD532B91B4BD652B91B6E8C8BD532B91
   B4BD652B91B660BD947AF030,6024
SB 1590 DATA BD8D7AD019A9089D6A7ADE7F7ADE
   867AA9019D717A9D8D7AA9F09D1F7A60BD1F7A
   F00160A9009D947A9D8D7AFE,5942
RH 1600 DATA 497A60BD787AD035AD0AD22901D0
   0160AD037ACD017AD00160BD497AF00160EE03
   7AA9309D187A9D787AA9009D,4983
YZ 1610 DATA 717A9D6A7AA9809D7F7AA9819D86
   7A60BD187AF00160BD117AF00160AD467A9D11
   7ABD717AD02DFE6A7ABD6A7A,5704
GH 1620 DATA C908D017A9009D6A7AFE7F7AFE86
   7ABD867AC993D005A9019D947A20342ABD6A7A
   0AAA203C2B60DE6A7ABD6A7A,5431
OE 1630 DATA 101BA9079D6A7ADE867ABD867AC9
   80D009A9009D787ACE037A60DE7F7A20342ABD
   6A7A0AAA203C2B60BD772B91,4989
IC 1640 DATA B4BD872B91B6E8C8BD772B91B4BD
   872B91B660BABBBCBDBEBFC0C1C2C3C4C5C6C7
   C8C900000000CACBCCCDCECF,7095
NK 1650 DATA D0D1D2D3D4D5D6D700009E9FA0A1
   A2A3A4A5A6A7A8A9AAAB00000000ACADAEAFB0
   B1B2B3B4B5B6B7B8B9AD00D0,6875
EZ 1660 DATA 2908D001608D1ED0AD597A38E928
   4A4A186D99238DAB7AA200BD0A2738EDAB7AC9
   04B018A9019D5C7AA9AA8D05,4766
LL 1670 DATA 7AA90A8D067AA9008D087A201835
   60E8E007D0D860A910A2119DD723E89DD723AD
   457A8D507A8E027A20B526AD,5005
LY 1680 DATA 457AF00160A9018D407A20E12DA9
   018D047A203127204727A90A8D277AA9018D50
   7AA9098D027A20B526203 42C,3842
KX 1690 DATA CE277AAD277AD0E8A9108D1C02AD
   1C02D0FB60A9AD8D01D28D477AA9208D00D220
   FD28CE477A8D01D2AD477AC9,5478
AW 1700 DATA BFD0F0A9008D01D260A200BD497A
   D00160E8E007D0F5CABD787AF00160CA10F768
   684C732C20472720E12DA901,5515
TS 1710 DATA 8D047A203127A203A9019D08D0A9
   389DC002BDDD2D9D00D0CA10EDA20086B0A904
   85B1A9BE8D277AA9228D477A,5099
UF 1720 DATA 20F82CE6B1A9448D477AA22220F8
   2CE6B1A9668D477AA24420F82CE6B1A9888D47
   7AA26620F82CA00020072DA0,5426
ZR 1730 DATA 0220072DA00420072DA9608D1C02
   AD1C02D0FB202D2DA9008D08D2A9008DC8024C
   0020A054BD552D91B0C8E8EC,4254
WQ 1740 DATA 477AD0F460A9A89901D2A9788D2F
   7A9900D2A9018D1C02AD1C02D0FBEE2F7AAD2F
   7ACD277AD0E8EE277A60A206,5625
VO 1750 DATA A035BDD723D94B21F0049008B007
   E8C8E00CD0EE60A206A035BDD723994B21C8E8
   E00CD0F460FFFF8181BFBFBF,6404
KY 1760 DATA BFB9B9BDBD8181FFFF0000FFFF81
   81BDBDBDBDBDBDBDBD8181FFFFFFFF8181BDBD
   8181BDBDBDBDBDFFFF0000,7803
SS 1770 DATA FFFFBDBDBDBDDBDBDBDBE7E7E7E7
   FFFFFFFF9999A5A5BDBDBDBDBDBDBDBDFFFF00
   00FFFF8181BFBF8787BFBFBF,8737
IC 1780 DATA BF8181FFFFFFFF8181BFBF8787BF
   BFBFBF8181FFFF0000FFFF8181BDBD8181B7B7
   BBBBBDBDFFFF64758697A981,7743
YI 1790 DATA 85B1A90085B0A200BC0A27A90091
   B0C891B0E8E007D0F1E6B1A5B1C993D0E760A2
   02AD0CD03D2B2ED00BCA10F5,6131
HL 1800 DATA AD04D0290FD00160A9018D2A7A9D
   9C7AA9009D357AA9408D427A60020408AD007A
   C901D00160AE9B7ABD9C7AD0,4757
XB 1810 DATA 034C872EBD357AF00160 20DC30A9
   029D357ABD2B7AC908D018A9009D9C7A9D2B7A
   9D9F7AA9058D507AA20B8E02,4757
TV 1820 DATA 7A20B52620D72FAD9B7AAAF008E6
   B1C901F002E6B1BDA87AA820C43060BD357AF0
   01608AD012AD007AC902D001,5584
VM 1830 DATA 60C903D00160C905D01F60C901D0
   0DAD007AC903D00160C904D00E60AD007AC902
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MA 1840 DATA 6902CD0AD2900160AD0AD229F090
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FE 1850 DATA A57A9D01D020E02F9DA87A20752F
   A901AE9B7A9D9F7A60BDA27AF006FEA57A4C16
   2FDEA57A8AD030BDA27AF00F,5790
GM 1860 DATA BDA57A186D397ACD517A90234C39
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QH 1870 DATA F013BDA87ACD527AF00BB006FEA8
   7A4C602FDEA87ABDA57A9D01D0D009A9009D9F
   7A20EA2F6020752F60BD9F7A,5692
YZ 1880 DATA D01DBD04309DC102A9009D3A7AAD
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DJ 1890 DATA 7A187D0A308D477A20D72F8AF008
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   7ABD103091B0E8C8CE277AAD,5642
RX 1900 DATA 277AD0F160A90585B1A90085B060
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EW 1920 DATA 4900007E2424183C7E663C00003C
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KI 1930 DATA 08D038162020000000008244281028
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MU 1940 DATA 00000000010387CBEBE7C000000
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TK 1950 DATA FF9191FF7E3C00003C7EFFC1C1FF
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MS 1960 DATA 2B7AA8A90018690B88D0FA8D477A
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FH 1970 DATA 8D337AA93F8D417A60AD3F7AF013
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TC 1980 DATA 15ADFC02C921D020A9FF8DFC028D
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ZW 1990 DATA AD387A8D3E7AEE3D7AAD3D7AC903
   D00BA9008D3D7A4C8231CE3E7AAD287AF003CE
   287AAD267AF003CE267AA200,5064
HM 2000 DATA BD0A7AF003DE0A7ABD1F7AF003DE
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   E007D0DBA200BD357AF003DE,5637
EC 2010 DATA 357AE8E003D0F320DC2BAE077A10
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   03D2A9B48D02D2CE427AAD41,5026
TI 2030 DATA 7AF0144A4AAABDA6358D01D2A928
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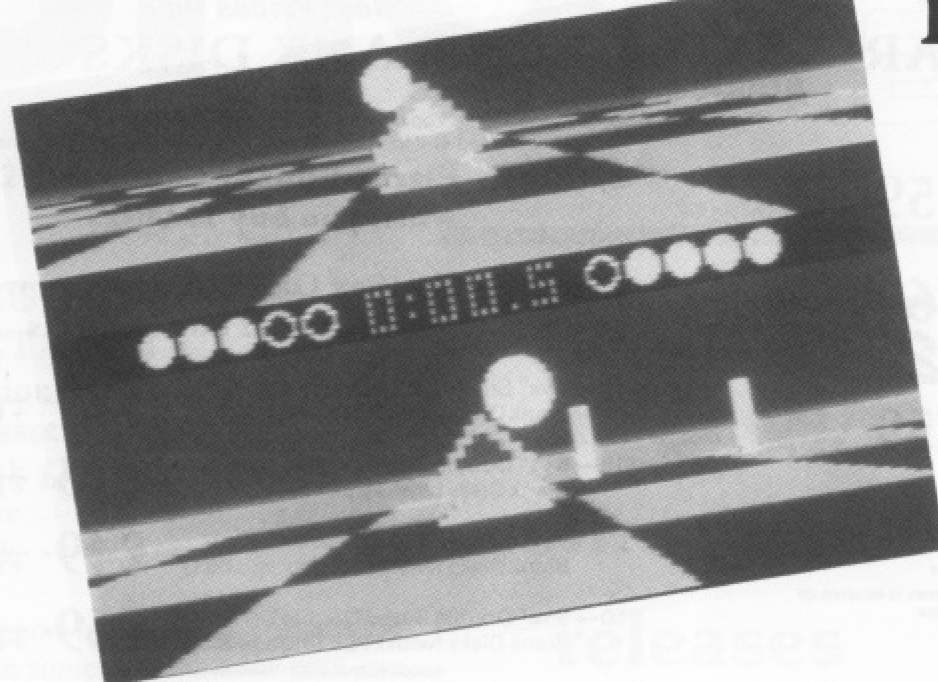
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PQ 2040 DATA 287AF0034C62E4AD2A7AF050A203
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XC 2050 DATA 8D437A8D047ACE317AAD317A1869
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   B3A90085B2AC527A208D344C,4867
LI 2060 DATA 62E4AD78022901D003CE527AAD78
   022902D003EE527AAD78022904D00BA9018D53
   7A20F3334CEA32AD78022908,4380
WO 2070 DATA D00BA9008D537A20B8334CEA32AD
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JP 2080 DATA D006EE517A207435AD527AC936D0
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EG 2090 DATA 7AF028AD517A8D00D0AD537AF005
   A20C4C3E33A200AC527AA90C8D2F7ABD883399
   0004E8C8CE2F7AD0F360AD53,5285
AT 2100 DATA 7AF00EA224AD517A38E9048D00D0
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UX 2110 DATA 2F7AD0F36000FC6078387FFEFF7F
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MA 2120 DATA 00182132F9000000AD557AF013CE
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GV 2130 DATA 204A344CE933EE517A202635AE56
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JM 2140 DATA 60AD557AC90AF00CCE517AEE557A
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   287A60030303020202010101,3715
RQ 2150 DATA 0100AD517A1869098D05D0A9088D
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DL 2160 DATA 7A186905A8B9000329F3990003B9
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FB 2170 DATA 7AAE307ABDB53491B2E8C8CE2F7A
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QO 2180 DATA 000000000010107C101000000000
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VO 2190 DATA 0000895224800124429100000081
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GD 2200 DATA A01EB9000329FC990003C8D0F560
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KV 2210 DATA 7A8D04D4AD9923C9D3D011A9008D
   9923A2004C6935AD447A8D04D460EE9923AD99
   23A2009D9923E8E8E8E03CD0,5669
GL 2220 DATA F660EE447AAD447A8D04D4C904D0
   19A9008D04D48D447AAD9923C900D00BA9D38D
   9923A2004C693560CE9923AD,5334
WH 2230 DATA 9923A2004C6935A2A2A2A4A4A6A6
   A8A8AAAAACACAEAE0000000000000000000000
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BY 2240 DATA 0000000000000000000000000000
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CB 2250 DATA 0000000000000000000000000000
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CE 2260 DATA 0000000000000000000000000000
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CH 2270 DATA 0000000000000000000000000000
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   000000000000000000000000,0
CK 2280 DATA 0000000000000000000000000000
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CN 2290 DATA 0000000000000000000000000000
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BO 2300 DATA 0000000000000000000000000000
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BR 2310 DATA 0000000000000000000000000000
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BU 2320 DATA 0000000000000000000000000000
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BX 2330 DATA 0000000000000000000000000000
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CA 2340 DATA 0000000000000000000000000000
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CD 2350 DATA 0000000000000000000000000000
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IE 2360 DATA 0000000000000000000000000000
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MZ 2370 DATA 0000000000000000003000030F3F
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EG 2380 DATA 00F0FFFFFF3FFFFF000000F0FFFF
   FFFF0000000FFFFFFCFF3F0F3FFFFFFCF0FC3F
   3F3F3F0F033FFFFFFFFFF0F0,7098
CO 2390 DATA FFFFFFFFFF000C3CFCC0F0FCFC3C
   0C0000030F3F3F3F3FFCF0FFF0F0FFFFFFFF3F
   FC3C0C00FFFFFFFF00000C3C,6603
CC 2400 DATA FCFCF0C0F0FC3F3F3F3F0F033FFF
   FFFFFFF0F0F0FFFFFFFF00000000C0F0FCFC3C
   0C0000030F3F3F3F3FFCF0F0,6531
LN 2410 DATA F0F0FFFFFFFF3F00000000FFFFFF
   FF00000C3CFCFCF0C0F0F03C3F3F3F3FFC0000
   00FFFFFFFF3F000000FFFFFF,6483
QR 2420 DATA FFFC0F0F3CFCFCFCFC3FF0000000
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JM 2430 DATA 3F3F3F0F033FFFFFFFFFF0F0F0FC
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KP 2440 DATA 0F0F0FFFFFFFFFFCC0F0FCFCFCFC
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LH 2450 DATA FFFCF0030F3F3F3FFFFFFFFFFFFC
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DM 2460 DATA EAFE0E0E0E0EC0B0B0B0B0B0B0B0
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OQ 2470 DATA FF000000C0B0ACACF0030E3A3A3A
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CY 2480 DATA 3A3A0E033AEAEBA8ABAAAAFFB0C0
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JA 2490 DATA 4444544040404054040404444444
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OG 2500 DATA 0055000000000000000000000000
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BV 2510 DATA 0000000000000000000000000000
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CB 2530 DATA 0000000000000000000000000000
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CE 2540 DATA 0000000000000000000000000000
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CH 2550 DATA 0000000000000000000000000000
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MI 2610 DATA 0C0F03000C0C0C3C30F0C0003F3F
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FQ 2620 DATA FCC0FCFCF0C00010444444441000
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OK 2640 DATA FDFDF5D5F05C7F577F7F5F570F3D
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AD 2650 DATA 00330F3B3FCF0C0000CCF0FCFCF3
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UR 2660 DATA BCFC00000000C0330F3F00000000
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MZ 2670 DATA 00000003CC3F00000000000000FC
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RA 2680 DATA F330FC00000000003FCF0C3F0000
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VV 2690 DATA 3F0000F0FCFCF330FC0000330F3F
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JU 2710 DATA FC00000000C33303FA000000000C
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NK 2720 DATA 00000C3000000000000000C30000
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KN 2730 DATA 0C000000000000333C3000000000
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OS 2740 DATA 0000B0FC00300C00000003FA3F03
   33C3000000B0FC00300C00003303FA3F0333C3
   003000B0FC00300C00000000,2693
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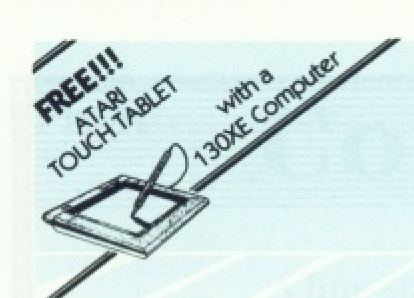
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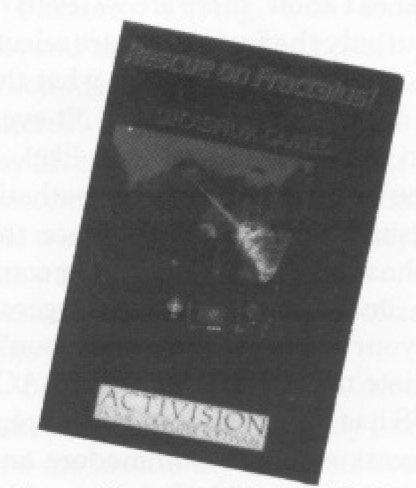
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This game was first conceived by Lucasfilm something like one year ago under the title BEHIND JAGGI LINES. For various reasons, it never hit the market except in illegal form, and for many months it looked as if Atari owners were going to miss out on this remarkable game. Firstly, Epyx were rumoured to be releasing it under license, but sadly that deal fell through. However, you'll be delighted to learn that Activision have come to the rescue, with 'rescue' being the appropriate word. They have taken the old JAGGI LINES, and after one or two minor improvements have finally released it under the title RESCUE ON FRACTALUS.

FRACTALUS is a three-dimensional space game which successfully combines flight simulation with arcade action. Lucasfilm have taken various elements of several leading games and merged them together to form a totally unique concept which deserves to be a classic in its own right.

You begin the game at the controls of your Valkyrie spacefighter as it sits in the take-off bay of the mothership. Your view is through the cockpit window of your spacefighter. Your instrument panel is spread out in front of you, consisting of an impressive array of flashing lights and dials. Press the firebutton and the take-off doors slide open, accompanied by some truly excellent sound effects, whereupon you are rocketed out through the take-off port into space. Once out in space, you automatically drop down into the harsh atmosphere of the planet FRACTALUS and then down towards the mountainous surface of the planet itself. The instrument panel suddenly bursts into life as your ship switches over to manual control. Now it's up to you!

The game theme is fairly simple. You are at war with an evil alien race called J'hagga Ra Kachatki - or 'Jaggis' for short. Out in space, the Jaggis were fairly easy pickings for your elite Ethercorps pilots, but now the fiends have dug in on Fractalus, a particularly inhospitable planet with its atmosphere of deadly cyanitric acid. Casualties are high, and it's your job to fly down to the mountainous surface of the planet in a search for stranded Ethercorps pilots who are waiting to be rescued. The Jaggis don't take any prisoners, so they desperately need your help - fast!

A combination of joystick and keyboard controls are required to operate your ship, but thankfully the keyboard options are kept to a minimum and gameplay is surprisingly simple. If only all flight simulators were that easy!

Graphically, the game is a masterpiece. The visual effect of navigating your ship through the mountains is really quite stunning. In fact, it's easy to get carried away and imagine that you actually are sitting at the controls of a Valkyrie spacefighter rather than a computer keyboard. I suppose all flight simulators are supposed to convey this effect, but how many of them do? FRACTALUS leaves them all standing in the realism department.

Lucasfilm are sticklers for detail. When you land to rescue a pilot you actually see him - all kitted out in spacesuit and helmet - walking hurriedly towards your ship, growing progressively larger as he approaches. A knock on the airlock door lets you know that he's reached the ship. If you impishly refuse to open the airlock door, his knocks become increasingly more urgent. I'm told that if you still refuse to open the Airlock his knocks get weaker and weaker until he finally collapses and dies, killed by the acid air eating its way through his suit. I haven't got positive proof of this though, as so far I haven't had the heart to kill a pilot off like this. Those desperate knocks get to you in the end and you'd have to be a real sadist not to give in and open that airlock!

There are a set number of pilots to be rescued on each level, with bonus points awarded for rescuing 'ace' pilots (ace pilots have purple helmets, ordinary pilots have white ones). When you have completed your task you then boost back to the mothership, where you will be given a scoring bonus before advancing onto the next level of play.

The initial levels are fairly routine in order to let you get the hang of the various controls. The action is stepped up from Level 4 onwards, where you must blast your way through Jaggi gun emplacements situated in the mountains with your AMB laser cannon. Suicide saucers make life extremely hazardous, and you will also encounter

the infamous Fractalus 'nine minute day' where you will be forced into some tricky night flying. Life as a rescue pilot certainly isn't easy and the surprises come thick and fast as the levels increase. One particular surprise is guaranteed to make your hair stand on end (literally!), but I won't spoil it by divulging it here. All I'm going to say is watch out for those pilots with green helmets!

As far as I know, there are 99 levels of play, but only the first sixteen are selectable at the start. Having seen what the action is like on Level 16, I don't even want to think what Level 99 is like!

If you've seen any of those pathetic little games that frequently grace the top of the software charts for other computers, and, like me, have sniggered under your breath at them, then you'll appreciate that RESCUE ON FRACTALUS has little chance of being a raging success amongst Commodore and Spectrum owners. It's far too sophisticated for that. Atari owners are used to a higher level of sophistication though, and consequently can recognise a real classy game when they see it. RESCUE ON FRACTALUS is a masterpiece of programming and I cannot recommend it highly enough. The graphics are 'out of this world', with the sound effects almost equally so. I would rate it second only to the legendary STAR RAIDERS. What more can I say, except go out and buy it ... immediately!

BOULDERDASH

Mirrorsoft/First Star
48k cassette £9.95
1/2 players
Joystick(s)



This game from First Star Software originally appeared in the States at the back end of 1984 and has been available on import in this country for almost as long. Now it is an official UK release, courtesy of Mirrorsoft, and thus to all intents and purposes it can be classed as a 'new' game, especially as far as recent converts to the Atari are concerned.

BOULDERDASH is a tunnelling game with a difference. You control a cute little character called Rockford, who has an acute fondness for diamonds. You use a joystick to guide him around the screen, digging his way through 16 different levels of play and risking life and limb - not to mention falling boulders, fireflies, butterflies and amoeba - in his never-ending quest for a fistful of diamonds (sounds like a new spaghetti Western, doesn't it?)

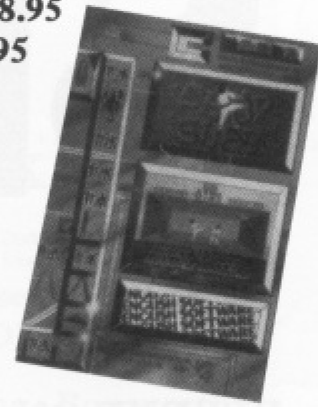
Before each game you have the option of choosing your starting level or cave in multiples of four. Rockford begins each screen with a set number of diamonds to collect, but with no visible exit. The exit is revealed once he has gathered up his quota of gems for that level. Some screens are relatively easy, and it's simply a matter of tunnelling your way around, picking up the diamonds whilst avoiding falling boulders. Others require a certain degree of skill and dexterity and also a significant amount of brainpower. The instructions enclosed with the game give only the briefest outline of what's expected of you, and you basically have to figure out the individual screens for yourself. As you progress you will encounter a series of intricate puzzles which will have to be solved in order to continue, so the challenge is maintained throughout the 16 levels.

The graphics are excellent and surpass all other games of this type. Rockford himself is an amazing little chap. If you refuse to move him he stands there, arms folded, blinking his eyes and tapping his foot repeatedly in a show of impatience. The sound effects deserve special mention, as there are some really neat ones in there, such as the tinkling sound the diamonds make when they fall, and the gurgling noise of the amoeba as it spreads its way across the screen.

BOULDERDASH was a number one hit in the States and in its various conversions for other computers has been highly successful here also. The Atari version was out first (despite what certain commercial 'gutter press' computer games magazines would have you believe!), and needless to say it's streets ahead of all other versions, with superior graphics, colour, sound and animation. Most Atari owners will already have BOULDERDASH in their collection. If you missed out on it, now's your chance to make amends.

CHOP SUEY

English Software
48k cassette £8.95
48k disk £12.95
1 player
Joystick



Karate games are all the rage nowadays and CHOP SUEY from English Software is one of several such games which have recently hit the market for Atari computers. Following in the tradition of their arcade counterparts, these games offer a head-to-head confrontation against an opponent in true 'blood and guts' style. Unlike Datasoft's BRUCE LEE, which was basically a platform game in disguise, CHOP SUEY is a true sports simulation and it gives you the chance to tackle a human or computer opponent in the combat arena without the risk of doing yourself any physical damage.

The action takes place on a box-type stage, watched by an eager audience sitting in several rows of seats in front of the stage. The intro tune is quite nifty and sounds as if it's being played on one of those old music-hall pianos, giving the game a certain theatrical atmosphere. After choosing your game options - computer or human opponent - it's on with the action. Both players are extremely detailed and look the part in their karate suits, with customary black belts (naturally!) All the actions are joystick implemented, and English Software are to be commended for not overcomplicating matters with additional keyboard options.

Strength bars at the bottom of the screen indicate the players' current status in the form of a pain barrier. When they change colour from red to orange you are at your lowest ebb, and one good blow from your opponent will drop your player to his knees, gasping for breath. Animation is superb as the players leap about the stage delivering quickfire combinations of kicks and punches. One small quibble is that the two players are identical, even down to the colour of their suits, and it's all too easy, in the heat of battle, to lose track of your player. You end up getting him confused with your opponent, which

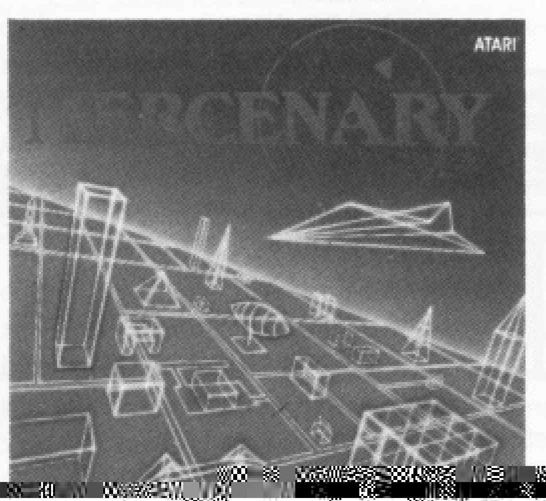
doesn't do your pain barrier a lot of good when you're desperately trying to avoid a killing blow. Different colour suits would have been a good idea.

Points are awarded for various aspects of play. How well you execute your move and whether it is defensive or offensive determines the number of points you score. In turn, you can only take a certain amount of punishment, and the game is over when your pain barrier reaches 8 units. If you are playing the computer and manage to beat it, you will get an automatic rematch against a much tougher opponent. The price of victory, I suppose.

Just to keep you on your toes, you must also keep a sharp eye out for oriental scorpions. These loathsome creatures drop out of the air-vents in the roof of the stage at random intervals. You must avoid them when they scuttle across the stage as their bite is potentially lethal, depending, of course, on the state of your pain barrier. In any case, a bite from one of these certainly won't do you any good!

English Software are onto a winner here. It will be interesting to see the opposition (INTERNATIONAL KARATE from System 3 and YIE AR KUNG-FU from Imagine), but CHOP SUEY will surely give them a run for their money. Graphics and animation are first-rate and, perhaps more importantly, it's an easy and fun game to play. Well done, English Software!

Next issue



SUMMER GAMES

Epyx/U.S.Gold
48k Disk £14.95
1/8 players
Joystick

The fact that Britain is a nation of sport lovers is reflected in the overwhelming number of new software releases dedicated to one sport or another. In the comfort of your own home you can now participate in a wide choice of sports ranging from cricket to karate or baseball to boxing. Track and Field type games started the ball rolling and they are still quite popular, so much so that US GOLD have now released SUMMER GAMES in the UK. It was previously available only on import.

The game is based on the Los Angeles Olympics and when you first boot up the disk you are treated to a short animated sequence depicting the opening ceremony of the games where a lone athlete mounts the steps with a torch to light the Olympic Flame and then a flock of white doves (symbolising peace) are released over the stadium.

Up to eight (yes, eight!) players can take part and each has the choice of representing one of seventeen individual countries around the world. The flags of all countries are displayed on screen and when you choose a country you get a brief burst of the appropriate national anthem.

There are eight different events in all - Pole Vault, Platform Diving, 4 x 400m. Relay, 100m. Dash, Gymnastics, Freestyle Relay, 100m. Freestyle and Skeet Shooting. Usually these sort of games require you to toggle the joystick back and forth at great speed in order to get your athlete up and running and, consequently, are 'lethal' to joysticks that use bubble contacts. Whilst Activision's DECATHLON is a great game, a hard session could prove very costly in joystick replacements. Not so with SUMMER GAMES. Only the two running events require this hazardous joystick operation and so you can play the with the Pole Vault. You can adjust certain parameters such as the bar height and pole grip before attempting each vault. The animation is impressive with the pole bending under the weight of the athlete before catapulting him over the bar. Or at least that's the general idea. I'm afraid that all my attempts at clearing the bar proved negative and I definitely need more practice at this event.

Platform Diving was completely beyond me without the benefit of instructions. Pity as it looked the most interesting of them all. Try as I might, my diver always ended up going into an uncontrollable spin and crashing into the water in true 'belly flop' style! Not the way to do it and the judges rewarded me accordingly with a series of zeroes. I enjoyed trying though.

The running events are much of a muchness so I'll skip quickly past them and move onto my favourite event, the Gymnastics. This takes place over the vaulting horse and your athlete undergoes a quick sex-change as you now control a girl athlete for this one event. You can use the joystick to vary the degree of difficulty of the vault and you can even attempt something complex like a triple somersault if you feel like living dangerously. The difficult part is making the athlete land upright on her feet and some of my uncontrolled landings looked painful in the extreme.

The swimming events are next and I've got mixed feelings about these. They are laboriously slow and whilst the 100m. Freestyle is only over two lengths of the open-air pool and is short enough not to get too boring, the Freestyle Relay drags over eight lengths and does get rather tiring. On the other hand the sound effects are great.

After that, the final event - Skeet Shooting - comes as a welcome change. It's also the easiest event by far as you are only required to line up the target sight on the black skeets and blast them out of the sky.

The program allows you to compete in all the events, one individual event, or to practise any of the events so there is a good deal of variation. Graphics are

SUMMER GAMES was priced at around £35 on import but the U.S. GOLD release should be around £15 on disk. I am not sure if it will be on cassette, best check with your dealer.

Overall, a worthwhile investment if you enjoy this type of game. I hear that SUMMER GAMES II is even better. Can't wait!

FIGHTER PILOT
Digital Integration
48K Disk £12.95
48K Cassette £9.95
1 player
Joystick/keyboard

A couple of days before we completed typesetting on this issue, a copy of FIGHTER PILOT arrived and it became obvious immediately that a simulation of this complexity could not be reviewed fully in the time available. A brief description here then and a full review next issue.

I am sure that the program would have been called F-15 Strike Eagle if that title had not been used already, as it features a full simulation based upon the F15 Eagle, the USAF air-superiority jet fighter. The program features a 3-D view from the cockpit, fully aerobatic performance, air-to-air combat, crosswinds, turbulence and blind landing with training modes for each option and a pilot skill rating for each level.

The graphics are superb and the simulation very realistic and initial feelings are that anyone interested in flight simulations should check this out. We will ask one of our reviewers to put in several flying hours and give you a full mission report next issue.

Coming...

Ballblazer

Elektraglide

JOHN SWEENEY looks at a few Adventures

RED MOON
Level 9
32k Cassette £6.95



Level 9 seem to have learnt how to cram an incredible amount into 32K. Red Moon has more than adequate descriptions of over 200 locations, scattered with over 50 items, and inhabited by no less than 19 different beings with whom you can interact.

Its vocabulary is adequate, its ability to understand English not much more than 'VERB NOUN' but once you accept that (and, unfortunately, with few exceptions, that is true for most adventures today), then it is an excellent adventure. Level 9 have enhanced the usual text adventure concept by adding lots of Dungeons and Dragons elements. You start with 50 Hit Points. You lose Hit Points when you are wounded, and it also costs you Hit Points to cast spells. One nice touch is that SAVE is treated as a spell and costs you 1 HP each time you do it!

Magic is an important part of the game. There are ten spells documented in the instructions, each of which requires you to use a certain artifact as a focus. There are a further 12 magical items in the game, most of which are extremely useful (one is actually described as being 'vaguely magical'!). Learning your way around the dungeon, and how to use magic effectively, are important aspects of the game. There are also plenty of problems to solve and then there are the fights!

Some denizens attack you, some talk to you, some ignore you. Some of them are more valuable to you alive than dead. Some of them can be killed or avoided without a fight but if you do get into a fight then make sure you are well armed and armoured. You can fight with weapons or with spells, or indeed both. Likewise there are both physical and magical ways to defend yourself. The dungeon is littered with weapons, armour, a cloak, a ring, etc., some of them magical - one item, for instance, will improve your Agility.

Beware though of too much mayhem. In this game very few of your foes stay dead - they will return to haunt you as ghosts and attack you at the most inconvenient times! You can actually explore about 150 rooms without a fight (although not without a couple of killings!), but just one fight can open over another 40 rooms to you.

The implementation is excellent in that you get colourful graphics which whilst only simple line drawings of the rooms are very pleasant and are drawn VERY quickly at the same time as the text is being output to the screen, and AT THE SAME TIME as it reads your keystrokes. You can ,if you wish, turn off the pictures. There is a large keyboard buffer so that you can key your commands ahead as fast as you like without waiting for each response, but beware if you have killed too many denizens for their ghosts will get you while you are keying! The people at Level 9 obviously know how to use the inside of the Atari.

Your objective in the game is to rescue the stolen Red Moon Crystal but don't assume that once you have found it you can wave your magic dulcimer and escape to the surface. Once you pick it up it's guardians appear, and they make everything you fought before pale into insignificance. However, since you are allowed to have three lives, you can die gracefully, be reincarnated and fulfill your quest without finding out how to win that final battle. You will however only achieve 1000 points if you



NEWS FOR ATARI 8-BIT COMPUTER OWNERS

Silica Shop, the UK's leading Atari specialists, based in Sidcup Kent have announced a massive drop in the price of the Atari 1050 Disk Drive. The 1050 is compatible for use with the Atari 400/800 and XL/XE computers and allows access to a range of over 450 disk-based software titles. The 1050 comes with DOS 2.5, and can also be used with other Atari Disk Operating Systems, making it compatible with the complete range of Atari Corp and Third Party software for Atari 8-bit computers. The addition of a disk drive is a great enhancement to any computer system, increasing storage facilities and cutting information access time to seconds instead of the minutes taken by the 410 or 1010 data recorders. Many professional/business programs are only available on disk and not cassette. Until now, only a small proportion of Atari Computer owners have been able to benefit from the power and speed of the 1050. Now Silica are pleased to be able to offer the 1050 at a new low price of only £129 including VAT and FREE delivery. We also offer credit facilities allowing Atari owners to purchase it over 12 months for only £12.46 per month. The total purchase price over 12 months, with interest at a flat rate of only 16%, is only 12×£12.46=£149.52 (APR 32.3%). There has never been a better time for Atari owners to buy a Disk Drive!

SUPERB TECHNICAL SPECIFICATIONS

The 1050 is a dual density disk drive. This refers to the amount of information that can be stored on a single side of a disk. Three things determine the density of a particular disk format: The number of bytes in each sector, the number of sectors per track and the number of tracks per disk. Single Density formats give eighteen 128 byte sectors on each of their 40 tracks, thus giving a total capacity of 18×128×40 or 92,160 bytes. Double Density formats give sectors that are twice as large as the single density sectors and are capable of holding 256 bytes on each sector. This yields a capacity of 184 kilobytes per disk. There is also a third format, Dual Density which is the one used by Atari's new 1050 Disk Drive with DOS 3 and DOS 2.5. It has 26 of the 128 byte sectors on each of its 40 tracks, giving a total capacity of 133 kilobytes, which after formatting comes down to 127K. The 1050 is capable of running disks formatted in either single or dual density and can run either DOS 2, DOS 2.5, or DOS 3, this makes the machine completely compatible with all of the previous old style software. The 1050 is compatible with the 400/800 and the new XL/XE series of Atari computers. However, if you run a 400 or 800 you would need to already have at least 32K RAM of memory in your computer. The 1050 has a built-in 6507 micro processor and an onboard ROM operating system for automatic standby capability. It has automatic switching from single to enhanced density modes. It has a 'Disk Busy' indicator and up to 4 disk drives can be controlled at once. Included with the Disk Drive is the Owner's Manual, the DOS 2.5 Master Diskette, Reference Manual, I/O Data cable and Mains Adaptor. The 1050 disk drive comes with everything you need to plug it in and use it immediately.

FREE SOFTWARE

The new price for the 1050 disk Drive is not the only good news for Atari Owners. The Disk Drive now comes with three FREE software titles, in addition to the DOS 2.5 Disk and Manual. The first of these is The Payoff on disk, a new adventure game in which you play the leading role. On the reverse side of this disk is a demonstration program showing Atari's amazing sound and graphics. Also included is Home Filing Manager which will help you organise your files. It allows you to catalogue and file details of books, birthdays, your stamp collection or anything else which would normally require you to use filing cards. The software which comes free with the Disk Drive carries a normal retail price of £34.98 and is as follows:

HOME FILING MANAGER	£24.99
THE PAY OFF ADVENTURE	£9.99
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SOUND & GRAPHICS DEMO	FREE
Normal cost of FREE software	£34.98

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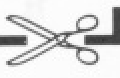
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rescue the crystal without dying, get all 9 treasures, complete one other minor quest which you must discover for yourself, AND do all this without SAVEing. In order to stop you restoring each fight until you have a lucky win, you lose 1 scoring point every time you SAVE. If you do all that you will definitely have got your money's worth, but there is one final challenge - it is possible to get 1000 points AND end the game with 50 Hit Points - can YOU do it?

EMERALD ISLE

Level 9
32k Cassette £6.95



Level 9 have produced six previous adventures for the Atari: the Colossal Adventure / Adventure Quest / Dungeon Adventure Trilogy, the Snowball / Return to Eden / (Worm in Paradise - may be out by the time you read this) Trilogy and the Lords of Time. Many of you will therefore be familiar with the value for money you get for their excellent adventures, normally priced at 9.95. They say that 'Emerald Isle is intended to be slightly easier to solve' and is therefore priced at only £6.95.

The game starts with you marooned on an island in the Bermuda Triangle, the only way off appears to be by becoming Ruler. How to do this is not immediately obvious - still you're bound to find out eventually, and in the meantime you may as well explore as much as you can, and find as many treasures as possible - they are bound to come in useful! Having explored the first twenty or so locations you come to find yourself faced with a number of problems: how do you start the clock? - why won't the Butler stay and talk to me? - where is the key to the gate? - why is there a letter 'W' cut into the lawn in the Hanging Gardens? - how do I read these notices in foreign languages or tiny print? - what is the invisible barrier that is preventing me from going West from the treasure room? - what am I supposed to do with a boat-building manual, a glue-pot, and four assorted coins? - should I risk going into the dark without a lamp? - why don't they provide a disk version for the Atari so that I can SAVE more easily?

Read the instructions again - Aha - 'Don't be too afraid of the dark' it says on the box - maybe that's a clue!

The rest of the above questions (apart from the last one!) mainly require patience. One very frustrating aspect to the game is the fact that a couple of times you solve all sorts of dependent problems, one leading to another as they do, and finally reach the end of a trail only to discover... nothing! The Museum and the Office fall into this category - but never fear, carry on with the game as though you don't care that you still don't understand what is happening. With enough patience all will become clear in the end.

Some of the problems seem insoluble, but have faith - there IS a way to climb the two slippery slopes without slipping, it IS possible to see underwater, and it IS possible to read the small inscription (the lens is actually in full view, you have probably walked past it a few times!). Two minor hints: EXAMINE everything - some very ordinary objects are not what they seem; and you never need to type more than two words.

There are unfortunately a couple of minor bugs. The first actually helps you - you can pick up objects in the dark even if you haven't the slightest idea what they are! (No of course I'm not going to tell you how, but it IS possible to solve the game WITHOUT doing this.) To compensate they have put in a bug which can delay you indefinitely: you should eventually find a plaque with a hole. You will probably try inserting items into the hole. If you try INSERT DUBLOONS and it says 'It doesn't fit. Try a coin', DON'T BELIEVE IT! This is a standard response associated with the dubloons, and should have been suppressed in this instance. The item you have to insert is very, VERY much bigger than a coin! I was also rather disappointed by the number of times you had to travel vast distances to very little purpose. There are five main areas which extend a long way from the central beach, and too much of the game is spent trekking from the far end of one of these areas to the far end of another area, via the beach. The placing of artefacts at the opposite end of the world from where they are required is occasionally interesting, but seemed a trifle overworked in this game. Further long and unnecessary journeys are necessitated by the fact that there are far too many items to carry. Allowing more to be carried (perhaps by some devious means?) would have removed some of the drudgery from the game.

All that aside it is still a very enjoyable game and excellent value for money, with over 200 locations and about 60 artefacts. Anyone who enjoys playing adventures will find the low price an offer very difficult to refuse. Even if it IS slightly easier than some of Level 9's previous offerings it will still keep you occupied for a considerable time, and the 30K or so of text contains plenty of amusing touches! For anyone who has not yet taken the plunge into adventuring, and can't afford to buy an Infocom adventure such as Wishbringer, Emerald Isle offers an excellent introduction to a very enjoyable pastime.

WISHBRINGER

Infocom
48K Diskette £29.95

Wishbringer is the latest text adventure from the acknowledged Number One in the field - Infocom. Anyone with an interest in good adventures must surely be familiar with at least some of their previous 15 adventures, from Zork through to the Hitchhiker's Guide to the Galaxy. Their new game is undoubtedly up to their usual very high standard, and, although it is labelled by Infocom as an 'Introductory Level' adventure, it is bound to please even the most experienced adventurers.

Wishbringer comes with the usual high quality packaging, complete with the actual Wishbringer stone (it glows in the dark!), a Mysterious Envelope (not to be opened until delivered!), a map of the whole village wherein the game takes place, and an excellent manual, complete with legends and sample scripts to help the inexperienced.

The game is introductory in two senses. First, lots of help is provided, once you have found Wishbringer (and the appropriate artifacts to activate it) you can wish for Advice. Some of the problems can also be solved by using a wish (you have seven wishes in total) and the map saves you the problem of mapping most of the game and also includes a clue. It does serve another purpose but you won't discover that till much later!. It is also 'introductory' in

that it is actually Zork 0! (Check the product code on the diskette if you don't believe me.) At one point in the game you find yourself 'standing in an open field west of a white house, with a boarded front door. There's a little mailbox here.' Just in case you have been living North of the Arctic Circle for the last ten years - those are the opening words of the legendary ZORK. If you do the right things the mailbox will uproot itself and follow you lovingly around for the rest of the game! As you leave this mysterious area you are warned that you have a feeling that you will see this place again!.

When you start the game you find yourself a humble post boy in a small village. You soon discover that your mission in the game is to deliver a letter to an old lady. This all seems innocent enough, and you only have to solve a couple of problems to achieve it. That's when the trouble starts! She gives you another mission - to rescue her cat! What she doesn't tell you is that failure to do this will result in doom for all, and that the village has been transformed in to an evil place full of evil monsters from your worst nightmares.

As usual you have all the benefits of an Infocom game. It actually understands English - with the ability to parse input like 'give the brown letter to the old woman then ask her for a cup of water', and a vocabulary of over 1000 words. There aren't many things that you can type in that it won't understand and if it doesn't understand then it tells you why not. It has vast amounts of text stored on the diskette, so that responses to your actions are sometimes whole screenfulls of data. They have programmed interesting, misleading or humorous responses to just about anything you might try. For instance, it is possible to win the game without ever being caught by the Boot Patrol, but if you do get caught you can escape, not once but twice! If you are foolish enough to let yourself get caught again you get thrown to the sharks - but even now death can be avoided provided that you have made the right friends! Furthermore during the two pages of amusing text that scroll up at this point you will witness the demise of the Boot Patrol, AND you can still complete the quest! None of that is necessary to the main line of the solution - it's just there for fun - to make the game more enjoyable! With descriptions like Infocom's, who needs graphics? And finally, there is humour. All Infocom games are riddled with jokes, and this one is no exception. For example, in the Grue's nest (Grues are the nasty things that lurk in the dark) you will find a refrigerator, and since Grues like the dark, what could be more natural than the fact that the light inside the fridge goes OUT when you open the door?

One extra nice touch to the game is that when you finally complete the quest and save the world, you will probably find that you have not got all the points. The reason is that some of the points are gained by solving certain problems WITHOUT using wishes. So, you can play the game, happily using wishes where useful, until you have won once. Then you can play the game again, trying to solve it without wishes - two adventures for the price of one!

If you get hooked then you can carry on with Zork, Zork II, Zork III, Enchanter(Zork IV), and Sorceror (Zork V) and by the time you finish those they may have written the long awaited Zork VI! ●

ATARI

Build your own S

Much has been written recently in electronic hobbyists magazines about speech synthesisers, however many of these articles assume the reader is familiar with electronic circuits and components, and that they have the necessary equipment to manufacture their own foil PCBs(Printed Circuit Boards). In this article I have deliberately chosen stripboard to construct the project and I hope that the diagrams given will enable anyone to construct the synthesiser even if it is their first step into electronics.

PARTS LIST

The following order codes and prices are as quoted in the Maplin Electonic Supplies 1985 Catalogue.

Item Description	Quantity	Price	Order Code	Component
Resistors				
¼W Carbon 10K 5%	1	£0.03p	S10K	R1
¼W Carbon 33K 5%	1	£0.03p	S33K	R2
10K Pot Linear	1	£0.49p	FW02C	RV1
Capacitors				
10uF 25V Elect.	2	£0.12p	YY35Q	C1,C6
100uF 20V Elect.	1	£0.11p	FF11M	C7
22nF Ceramic	1	£0.07p	BX01B	C5
100nF Ceramic	1	£0.07p	BX03B	C4
22pF Ceramic	2	£0.07p	WX48C	C2,C3
Integrated Circuits				
SP0256 Synthesiser	1	£8.95	QY50E	IC1
LM386 Audio Amp.	1	£1.49	276-1731**	IC2
Miscellaneous				
Verroboard	1	£1.32	FL07H	
Loudspeaker 8R 0.3W	1	£0.98	WB13P	LS1
28Pin DIL Socket	1	£0.24p	BL21X	
14Pin DIL Socket	1	£0.11p	BL18U	
Ribbon Cable 10Way	1m	£0.75p	XR06G	
D-Socket 9 Pin	2	£0.95p	RK61R	
3.7268MHz Crystal	1	£2.98	FY86T	X1
22swg Tinned Copper	1 roll*	£0.95	BL14Q	
Solder 60Sn/40Pb	10m*	£0.82p	FR21X	

* Much smaller quantities of these items are actually required for this project but this is the minimum that may be obtained from Maplins.

** This IC is not available from Maplins the order code shown is a Tandy order code.

TOOLS REQUIRED

Small soldering iron
Scalpel, Modellers knife or Spot face cutter (Maplin Code FL25C £1.95) to cut veroboard tracks.
Small sidecutters or wirestrippers

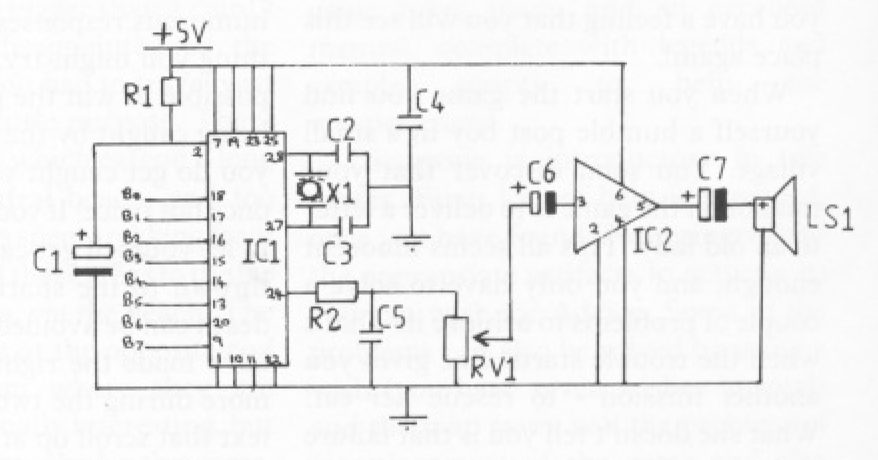
CIRCUIT DESCRIPTION

The schematic circuit shown below is based on the General Instruments SP0256 IC(Integrated Circuit).

Power for the circuit and the controlling signals to generate speech come from joystick ports 1 and 2 (ports 3 and 4 can be used on the 400/800 computers). Six bits from the 8 bit port are used to determine which allophone of the 64 available is generated, the remaining 2 bits are used as 'handshake' lines between the computer and synthesiser. Crystal X1 and capacitors C2 and C3 form a simple clock for the SP0256.

R2 and C5 act as a low pass filter which converts the SP0256 Pulse Width Modulated output to an audio signal. This audio signal is amplified by IC2, an LM386 audio amplifier which, together with a few support components, drives the loudspeaker LS1. Components R1 and C1 provide a Reset pulse to the SP0256 on power-up.

CIRCUIT DIAGRAM



SPEAKS

Speech Synthesiser

by Kevin Griffin

Figure A. Location of components on Stripboard

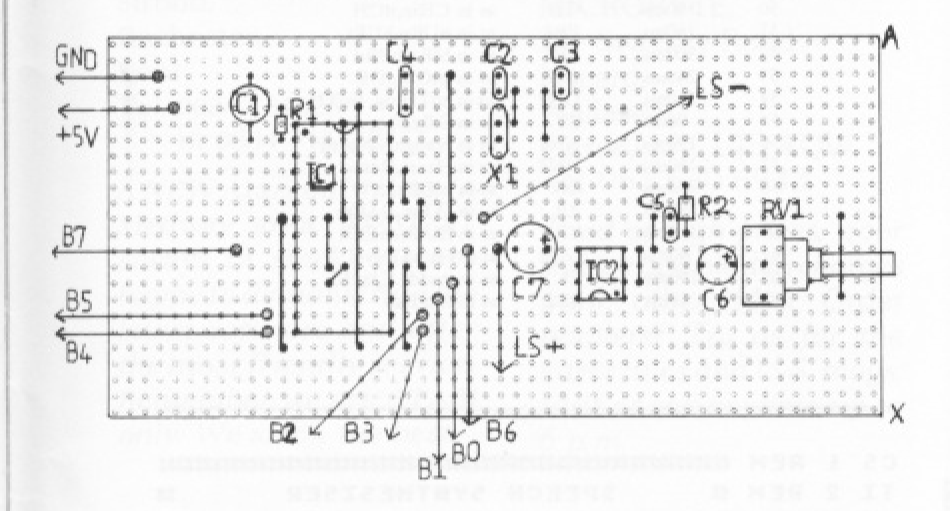
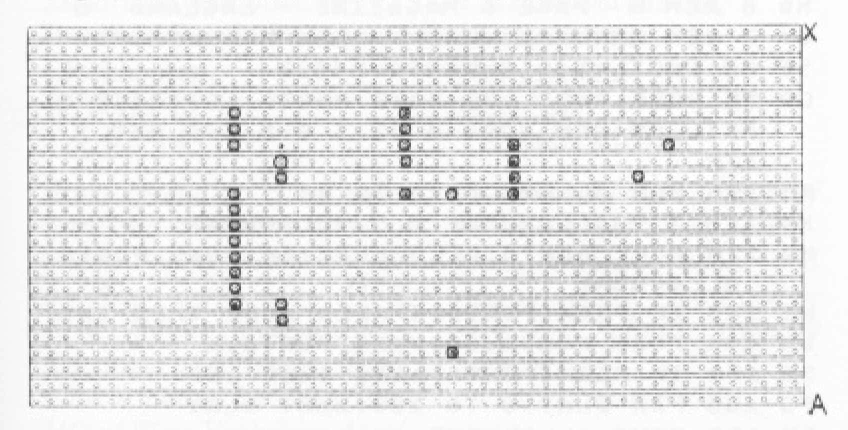


Figure B. Board side B showing cuts in tracks



CONSTRUCTION

Initially the copper tracks on the stripboard should be cut as shown in Figure B. A Spot Face Cutter is best for this purpose although a knife can be used if care is taken (always work away from your hands). Next solder the components to the board as shown in Figure A starting with the link wires followed by the IC sockets. The legs of the remaining components are best left at their full length until after the component has been soldered in position as this will help to conduct heat away during soldering. As an extra precaution against heat damage whilst soldering a small crocodile clip may be temporarily attached to the component on side A of the board.

Care must be taken that all electrolytic capacitors are connected the correct way round.

When the board has been completed the two D-Connectors should be connected to the ribbon cable according to the connection chart shown. The opposite end of the cable should then be bared and tinned about ¼ inch of its length. The tinned ends should then be inserted through the board and soldered in position according to the circuit diagram.

RIBBON CABLE CONNECTIONS

Cable Colour	D-Plug	End	Signal	IC1 Connection
White	Port2	Pin 4	B7	9
Grey	Port2	Pin 3	B6	20
Purple	Port1	Pin 1	B0	18
Blue	Port1	Pin 2	B1	17
Green	Port1	Pin 3	B2	16
Yellow	Port1	Pin 4	B3	15
Orange	Port2	pin 1	B4	14
Red	Port1	Pin 7	+5V	7,9,23,25
Brown	Port2	Pin 2	B5	13
Black	Port1	Pin 8	GND	1,10,11,22

Note on D-Sockets

Due to the recessed joystick ports used on all Atari computers the normally available D-sockets cannot be fitted directly. One solution to the problem is to buy joystick extension cables (these have the moulded plastic type sockets as fitted to Atari joysticks) such as those available from Tandy stores, however at prices in excess of £3 this is an expensive solution if they are to be used only for this project.

Another solution is to drill or hacksaw the metal body from the D-Sockets available from electronic suppliers, leaving the plastic core, the two halves of which should then be glued together. The appropriate connections can then be made to the back of the socket. This enables the socket to be connected to the computer but it leaves the wires and connections vulnerable to damage. I have overcome this problem by fixing the plastic covers which are often placed on new ICs to protect their legs. These fit perfectly to the back of the modified sockets and after the circuit has been tested and found to be fully working the cover formed by the IC protectors can be filled with an Epoxy Resin adhesive to make a really permanent and strong connector.

continued overleaf

TESTING AND USING THE SPEECH SYNTHESISER

The circuit should be thoroughly checked before it is connected to your computer. If all appears well, connect to the joystick ports 1 and 2 with the computer switched off. Switch on the computer and watch the screen for anything unusual. If the normal Start-Up does not occur switch the computer off and recheck the circuit.

When the READY prompt appears type in listing 1 and RUN it, it should say "Hello welcome to the Page 6 speech synthesiser demonstration".

Listing 2 will sound each of the 64 Allophones (components of speech) available.

Listing 1 can be used as a framework for your own sentences as each line of data represents one word. By changing this data with reference to the information below and changing variable LAST to correspond to the number of DATA items you can make your machine talk as you want it to.

The table of allophones gives brief details of each of the 64 Allophones. Maplin Project Book 6 (order code XA06G) gives a more detailed outline together with some theory of speech synthesis.

I hope this project will add a new dimension to your Atari and hope to bring you further Hardware Projects in the near future. ●

```
CS 1 REM ##################################
TI 2 REM #      SPEECH SYNTHESISER        #
ZV 3 REM #            by                  #
MI 4 REM #       K.J.GRIFFIN 1985         #
SG 5 REM # ------------------------------ #
XD 6 REM #  PAGE 6 MAGAZINE - ENGLAND     #
CY 7 REM ##################################
GD 80 PACTL=54018:PORTA=54016:LAST=60:DIM
    TALK(200),R$(1)
CQ 90 POKE PACTL,56:POKE PORTA,127:POKE P
    ACTL,60:REM PORT A BITS 0-6 O/P,BIT 7
    I/P
MF 100 FOR X=1 TO LAST
SI 110 READ A
IP 120 TALK(X)=A
LR 130 NEXT X
ZP 140 ALLOPHONE=1
DJ 150 IF ALLOPHONE>LAST THEN ? "KPRESS R
    ETURN TO REPEAT ";:INPUT R$:GOTO 140
IY 160 POKE PORTA,TALK(ALLOPHONE)+64:POKE
     PORTA,TALK(ALLOPHONE)
WS 170 IF PEEK(PORTA)=TALK(ALLOPHONE) THE
    N ALLOPHONE=ALLOPHONE+1:GOTO 150
OV 180 GOTO 170
LH 190 DATA 27,7,45,15,53,4
BL 200 DATA 46,7,45,8,15,16,4,4
HY 210 DATA 13,31,4
OG 220 DATA 29,19,4
TZ 230 DATA 9,20,10,4
XQ 240 DATA 55,12,41,55,4
LH 250 DATA 55,9,19,50,4
PZ 260 DATA 55,12,11,29,7,55,55,6,55,51,4
YT 270 DATA 33,7,16,24,11,55,17,39,20,37,
    49,24,11,4,4
MN 300 REM THIS PROGRAM MAY BE USED TO
          SAY ANYTHING YOU LIKE.
PY 310 REM JUST CHANGE OR ADD DATA FROM
          LINE 190 ONWARDS AND CHANGE
          VARIABLE LAST TO CORRESPOND
HP 320 REM TO # OF DATA ITEMS.
```
□

Table of SP0256 Allophones

Allophone Code	Duration	Sound	Produced
0	10ms	silence	
1	30ms	silence	
2	50ms	silence	
3	100ms	silence	
4	100ms	silence	
5	420ms	OY	as in bOY,tOY
6	250ms	AY	as in flY,tIe
7	70ms	EH	as in Edward
8	120ms	KK3	as in Car
9	210ms	PP	as in Pear,cliP
10	140ms	JH	as in juDGE
11	140ms	NN1	as in Now,turN
12	70ms	IH	as in tIn,pIt
13	140ms	TT2	as in To,Turn
14	170ms	RR1	as in Right,WRong
15	70ms	AX	as in Upper,lUck
16	180ms	MM	as in Monday,March
17	100ms	TT1	as in waiT,sTop
18	290ms	DH1	as in THat,THey
19	250ms	IY	as in trEE,mE
20	280ms	EY	as in lAke,trAy
21	70ms	DD1	as in liD,beD
22	100ms	UW1	as in yOU
23	100ms	AO	as in tALk,AWful
24	100ms	AA	as in trOt,tOp
25	180ms	YY2	as in Yes Yet
26	120ms	AE	as in tAp,pAt
27	130ms	HH1	as in Hair
28	80ms	BB1	as in Bleed,niB
29	180ms	TH	as in THin,THis
30	100ms	UH	as in cOOk,cUckoo
31	260ms	UW2	as in fOOd,hOOf
32	370ms	AW	as in nOW,OUt
33	160ms	DD2	as in Dart,Drip
34	140ms	GG3	as in Gas,piG,aGnostic
35	190ms	VV	as in Verse,Vent
36	80ms	GG1	as in Gate,Get
37	160ms	SH	as in SHelter,SHine
38	190ms	ZH	as in meaSure,aSian
39	120ms	RR2	as in bRight,gReen
40	150ms	FF	as in Fire,First
41	190ms	KK2	as in weaK,triCK
42	160ms	KK1	as in Cue,sCared
43	210ms	ZZ	as in Zebra,XYllophone
44	220ms	NG	as in siNG,paNG
45	110ms	LL	as in Leopard,Linger
46	180ms	WW	as in Window,Watch
47	360ms	XR	as in fAIR,bEAR
48	200ms	WH	as in WHen,WHich
49	130ms	YY1	as in compYuter,bEAUtiful
50	190ms	CH	as in CHin,itCH
51	160ms	ER1	as in bURn,hURt
52	300ms	ER2	as in bIRd,hERd
53	240ms	OW	as in snOW,tOE
54	240ms	DH2	as in noTHing, froTH
55	90ms	SS	as in Silly,Speech
56	190ms	NN2	as in Naughty,North
57	180ms	HH2	as in Heart,Home
58	330ms	OR	as in mORe,lAW
59	290ms	AR	as in fARm,alARm
60	350ms	YR	as in fEAR,chEER
61	40ms	GG2	as in Gun,Gravel
62	190ms	EL	as in middLE,ladEL
63	50ms	BB2	as in Bat,Ball

```
CS 1 REM ##################################
TI 2 REM #      SPEECH SYNTHESISER        #
ZV 3 REM #            by                  #
MI 4 REM #       K.J.GRIFFIN 1985         #
SG 5 REM # ------------------------------ #
XD 6 REM #  PAGE 6 MAGAZINE - ENGLAND     #
CY 7 REM ##################################
SE 80 PACTL=54018:PORTA=54016
CQ 90 POKE PACTL,56:POKE PORTA,127:POKE P
    ACTL,60:REM PORT A BITS 0-6 O/P,BIT 7
    I/P
BH 100 FOR ALLOPHONE=0 TO 63
XN 110 ? "KALLOPHONE # ";ALLOPHONE
HQ 120 POKE PORTA,ALLOPHONE+64:POKE PORTA
    ,ALLOPHONE
WC 130 IF PEEK(PORTA)<>ALLOPHONE THEN 130
LN 140 POKE PORTA,68:POKE PORTA,4
SG 150 IF PEEK(PORTA)>128 THEN 150
PG 155 FOR DLAY=0 TO 200:NEXT DLAY
DU 160 NEXT ALLOPHONE
LU 170 GOTO 100
```
□

GOTO DIRECTORY

The GOTO DIRECTORY is a guide to retailers who provide product support for Atari. Many of these retailers will supply Mail Order so if you have trouble finding a supplier, turn to the GOTO DIRECTORY.

Retailers who are interested in an entry in this feature are invited to contact the Editor on 0785 41153.

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contact

AUSTRALIA CALLING: Our family enjoy reading PAGE 6 very much and we would like to correspond with other Atari enthusiasts, particularly adventurers so we could swap clues. My son would like a hint in Sands of Egypt could someone tell him what the heiroglyphics in the outer chamber mean? Dell Johnson, 26 Henderson Street, North Rockhampton, Queensland 4701, Australia

ATARI 600XL MEMORY MODULE: For sale in perfect condition Atari 64k memory module. £40 o.n.o. Contact James Brown on 041 946 0264 most evenings after 6 p.m.

PIXSTICK LIGHT PEN: Complete with paintbox and additional software for sale. £15 o.n.o. For Atari 400/800 on cassette. Phone Adrian Barton on Welwyn Garden City 330393 after 4 p.m.

PRINTERS FOR SALE: A three months old Atari 1020 colour printer, hardly used. Perfect condition - £75. Dust cover included. Brother EP-44 printer/typewriter. AC/DC operation. Perfect condition. Compatible with Atariwriter. Near Letter Quality. £310 (Interface, paper holder, AC adapter and some printing paper all included). Send s.a.e. for more EP-44 information. P.S.Cheung, 28A, Holywell Hill, St. Albans, Herts, AL1 1BZ

AMATEUR RADIO: I have been interested in Amateur Radio for about 2 years and have had an Atari 800XL for about the same time. I would be very interested in hearing from anyone who has managed to combine these two hobbies with regard to software and hardware. G.W.Giles, 21 Monmouth Drive, Verwood, Wimborne, Dorset, BH21 6TN. Tel. Verwood 826763

PRINTER/PLOTTER & FEASIBILITY EXPERIMENT: Atari printer/plotter wanted. Also I need help on the Feasibility Experiment. I have found about 49 locations but I am stuck at the the dragon's lair, mine shaft and the stone temple. I have completed The Golden Baton and a s.a.e. is all I require to send the map to you. Phone Tony evenings 0675 64985

VERTICAL BLANK PROGRAMMING: Can anyone help explain how to use or program the VBI. I can't find any books or information on vertical player movement or scrolling. Andrew C. Thompson, 135 Henllys Way, St. Dials, Cwmbran. Gwent, NP44 7NF

HITCHHIKER'S GUIDE TO PRNTING PASCAL: Can anyone tell me where I can get a good version of Pascal. Can anyone give me some help on Hitchhikers Guide To The Galaxy and does anyone have a cheap printer for sale? Paulo Fragapane, 18, Parson Street, Bedminster, Bristol, BS3 5PT. Tel. 0272 663475

1027 POWER ADAPTER: For sale, never used £6. Other accessories also for sale. Conrad Hancock, 17, Victor Street, Mountain Ash, Mid Glam. CF45 3LG. Tel. 0443 474299

HOLLAND CALLING: A Dutch Atari owner would like to have contact with an English Atari owner for listings etc. I have Dutch and German listings. Please write to H. Baggerman, Rivierenlaan 43, 3181 DM Rozenburg, Holland

BACK ISSUES: PAGE 6 no. 1 and ANTIC vol.1 no.6 wanted. Will pay£3 for PAGE 6 and £6 for ANTIC to include shipping. Robert De Letter, Europapryslaan, 34, B-9060, Zelzate, Belgium

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ANY USERS IN CORNWALL?: I have just moved to Penzance and would like to meet any other users in the area. Please contact me. M. Rogers, 15, Pednandrea, St. Just, Penzance, TR19 7UA

600XL RAM PACK: 64k expansion, hardly used. £65. Also 600XL computer for spare parts only £25 o.n.o. Conrad Hancock, 17, Victor Street, Mountain Ash, Mid Glam. CF45 3LG. Tel. 0443 474299

SANDS OF EGYPT: I am a desperate adventurer. Please can someone tell me how to get into the pyramid. Karin Lockett. Westside House Golf Club, Brentwood Road, Orsett, Essex, RM16 3DS. Tel. 0375 8913520Ext. 25

1020 PRINTER/PLOTTER FOR SALE: Complete with manuals, leads, power supply and cassette with demonstrations and joystick sketchpad. Also Victagraph Plot Window, extra pens and 3 rolls of paper. Good condition, still under guarantee. Sell for £80 o.n.o. Phone Adrian Barton on Welwyn Garden City 330393

SYSTEM FOR SALE: 800 Computer, 810 Disk Drive and 410 Cassette Recorder. Any reasonable offer considered. P.Edwards, 174 Ynyscynon Road, Trealaw, Tonypandy, Mid. Glam. CF40 2LQ

BOOKS AND MAGS FOR SALE: ANALOG issues 2 - 7 and 9 - 19 £1.25 each. ANTIC vol.1 no.6 to vol.2 no.5 £1.25 each. ATARI USER 2 50p. PAGE 6 2 - 17 75p each. UK ATARI OWNERS CLUB (MONITOR) 1-9 50p each. ATARI BASIC - LEARNING BY USING £2.50. ATARI SOUND AND GRAPHICS £4. COMPUTE!'S FIRST and SECOND BOOKS OF ATARI £5 each. THE CREATIVE ATARI £7.50 DE RE ATARI £9. All in very good or mint condition and including postage and packing. Write or phone Mike Meara, 61 Borrowash Road, Spondon, Derby, DE2 7QH. Tel. 0332 663332



A LOOK BACK

As I mentioned in the last column, this one has to be prepared early so while all of you are busy working on your suggestions for the game outlined in issue 18 I will take this opportunity to go back over a few items I have touched on before.

BOOLEAN ALGEBRA

Back in issue 11 I discussed Boolean algebra and I have been asked if this can be utilised in any other subroutines, so what follows will be additional to issue 11 which you may need to peruse again.

Probably one of the most powerful, and possibly one of the least used, commands is the ON .. GOTO/GOSUB statement. If you have never used this before then I shall explain. Instead of using several lines such as

```
10 IF X=1 THEN GOTO 100
20 IF X=2 THEN GOTO 200
```

we can use a single line of ON/GOTO. We must get a value for the variable X, for example by using INPUT X, and then use this in the ON/GOTO statement. In our example X must equal (say) 1 to 4 or else be re-input. When we have a value we can use it to choose a subroutine as follows

```
10 ? "PRINT CHOICE (1-4)"
20 INPUT X : IF X<0 OR X>4 THEN 10
30 ON X GOTO 100, 200, 300, 400
40 REM - Subroutines in lines 100,200,300,400
```

If the limitations did not exist in line 20, then if X fell outside the range 1 - 4 it would be ignored and the program would continue to line 40. X must be in the range of 1 to (number of choices) for this to work. The subroutine is chosen from the value of X so that if X equals 10 then the tenth routine will be chosen. You must be sure to have enough subroutines to cover the maximum value of X.

What would happen if you used X=PEEK(764) when looking at a keyboard entry? As this means you could have several lines such as

```
10 IF X=250 THEN GOTO 100
```

you would then need 250 choices for the ON/GOTO routine to work. Instead we can set the limitation by Boolean algebra. For example, if we wanted X to equal 10, 20, 30, 40 or 50 only we would have to use five single lines of IF/THEN statements. A Boolean equivalent would be as follows

```
10  Y=(X=10)+2*(X=20)+3*(X=30)+4*(X=40)
+5*(X=50)
20 ON Y GOTO 100, 200, 300, 400, 500
```

To use the subroutine on line 200, X would need to equal 20. If it did then this is the only true statement in line 10. So (X=20) would be the only true statement and the line would evaluate as Y=(0)+2*(1)+3*(0)+4*(0)+5*(0), or 2. So on Y=2 the computer will choose the second subroutine at line 200. The values of the subroutines need not be in order, nor need the values of X, just as long as they correspond numerically to the subroutines.

USING LOCATE

I was asked by Stephen Plunkett to explain about the LOCATE statement. This is an excellent way of testing a location on the screen to see what is stored at location X,Y. It can be used in the same way as the PMG collision registers.

The statement takes the form LOCATE X, Y, Z. You just position the cursor (even if switched off) at position X,Y and the data under the cursor is stored in Z. So if the target is in COLOR 1, you know you have hit it when Z=1. Z will equal 0-3 in four colour modes, 0 or 1 in two colour mode - and 0-255 in the text modes.

Now for the bad news. A PRINT or PUT directly after the LOCATE will move the cursor one point to the right and may modify the character under the cursor. Here is the solution to this little problem. Locations 85 and 86 (cursor horizontal position) are updated by the LOCATE statement by adding 1 to the number stored here, thus repositioning the cursor. You can store the data from 85 and 86 first, use LOCATE, and then restore the data. For example

```
P1=PEEK(85): P2=PEEK(86): LOCATE X,Y,Z: POKE
85,P1: POKE 86,P2
```

Location 93 holds the data found under the cursor, so you would do exactly the same here to stop corruption of the data i.e. PEEK 93 first, use LOCATE and then POKE 93. Another handy set of locations is 94, 95 which holds the current position of the cursor. By the way, location 84 holds the vertical position of the cursor and you may need to use this after rollover when the cursor moves down a line.

The LOCATE statement is just like using

```
POSITION X,Y: GET #6,Z
```

I have included a simple little program to illustrate LOCATE in action. It should be well enough documented not to need an explanation.

DO-IT-YOURSELF REPAIRS

I was interested by the letters in issue 12. John Dimmer (a regular to PAGE 6) is quite right about paying someone to push in a few chips. If your machine is outside the warranty you could try this yourself but be careful to take anti-static

by Mark Hutchinson

```
EX 1 REM ################################
IT 2 REM # LOCATE demo                  #
PY 3 REM #        by Mark Hutchinson #
HB 4 REM # -------------------------- #
TQ 5 REM #     for PAGE 6 MAGAZINE      #
FC 6 REM ################################
EJ 9 REM *** Set up the screen with dots
XW 10 GRAPHICS 19:Y2=0:COLOR 1:FOR R=1 TO
   15:X1=35*RND(0):Y1=20*RND(0):PLOT X1,
   Y1:NEXT R
KZ 19 REM *** Plot a line.
RM 20 FOR X2=0 TO 38:COLOR 2:PLOT X2,Y2
LJ 29 REM *** LOCATE one point ahead of X
   2 - if COLOR=1 then GOSUB
OK 30 LOCATE X2+1,Y2,P:IF P=1 THEN GOSUB
   100
MV 39 REM *** Slow it down
FU 40 FOR TM=1 TO 20:NEXT TM
QA 49 REM *** If not, finish line and sta
   rt another
ZK 50 NEXT X2:Y2=Y2+1:IF Y2>23 THEN LIST
   :END
RW 60 GOTO 20
FU 99 REM *** Sound if found
W5 100 FOR S=15 TO 0 STEP -1:SOUND 0,20,1
   0,S:NEXT S:RETURN
```

precautions before touching chips, and if the IC legs are gold-plated do not rub it off. Reader B. Sutcliffe must have had a heart attack when he watched the service engineer open the cartridge with a screwdriver. If you try this then use something soft or plastic. Never, never use an eraser to clean anything - they contain emery or pumice dust and this is lethal. Use a proprietary cleaner/degreaser and cotton wool. Make sure that cotton buds are not glued on as the cleaner will dissolve the glue and leave you with a sorry mess. As a matter of fact, you should clean your cartridge edge connectors regularly before use, but never with anything abrasive.

I would like to wish all readers a very Happy Christmas and New Year and I am looking forward to a full post bag prior to my next column!

THAT *was*

A few of our contributors pi

As 1985 draws to a close we wanted to summarise what has probably been the most eventful year in Atari's history and so we asked several of our regular contributors to put together 10 'events' that they considered to be the most significant during the year. Here is what they had to say.

STEVE PEDLER whose article on ANTIC modes 4/5 was appreciated by many of our readers and whose Display Lists article is currently running, had this to say.

Picking ten 'significant events' was not as easy as I first thought. I have tried to keep to sensible suggestions as follows.

1. Release of the 520ST. Surely everyone's choice for the event of the year, this is the machine which will make or break Atari over the next 18 months. Presumably also at the top of every Atari owner's Christmas present list. Santa, are you listening....?
2. Release of the 130XE computer. If you believe (as I do) that, contrary to the 'industry observers' there is still a future in 8-bit micros, then this is the best there is. It even includes a manual!
3. Launch of 'Atari User' magazine. It may be a competitor for PAGE 6, but anything that increases public awareness of Atari has to be a good thing. I'm sure every Atari owner wishes them all the best for the New Year.
4. Acorn shares cease trading, Sinclair heavily in debt, Commodore computers no longer stocked by major retailers..... We shouldn't gloat over the misfortunes of others, but after all the trouble Atari had in 1984, when they all said Atari was dead, isn't it just a little bit gratifying?
5. Atari 800XL announced on TV to be the home micro of the year. We all knew it anyway, so what took them so long?
6. DOS 2.5 released by Atari. Significant for three reasons. It means that all Atari disk drive users have a compatible DOS. Secondly, Atari more or less gave it away - a welcome change from their previous attitudes towards software prices. Third, they actually admitted they had made a mistake with DOS 3.0. You wouldn't find that old Atari doing that!
7. Atari announce that the 130ST has been abandoned. If Atari have made a mistake this year, the this is it. The 520ST is great value for money, but there just aren't that many people around with £750 for a personal computer. The 130ST looked rather more affordable.
8. Several U.K. software houses bring out programs for the Atari. At long last, signs that the British software industry has realised that there is life beyond the Spectrum.
9. Infocom release 'Hitchiker's Guide' and 'Wishbringer'. Thus proving, as if it were really needed, that they are the best in the adventure game business.
10. 'Rescue on Fractalus' released at last! Last but not least of my events of the year. Was it worth waiting for? No question about it, this is one of the all time greats of computer games.

MARK HUTCHINSON has helped many beginners find their feet both through his First Steps column and by many hours spent answering people's letters. He is now finding his way around the 520ST but still has a regard for those of you starting out and will continue to write First Steps as well as help with your problems. Here is what he has to say about 1985.

Here goes, then. Ten events, not necessarily in order.

1. THE 520ST. When you consider that you can purchase a 512k 16 bit computer with hi-res monitor, 500k mini drive, mouse and several software packages all for the price that a 48k 800 cost when it first arrived in the UK *and* it is considerably less costly than its rivals, the 520ST must be the highlight of the year.
2. MICROLINK. Until now Atari owners have been left out of accessing the myriad data bases that have been available to other home computer users. The first few hundred hours may not come cheap due to the perennial problem of finding your feet on a new system, however, once you know what to do, the services available will be relatively cheap.
3. MIRACLE TECHNOLOGY. With the Atari 850 interface so hard to get, it is nice to see a firm take the plunge and not only design and build modems and an interface, but release software to back it up.
4. GST for the ST. As usual, when a new computer hits the market, the initial software tends to be expensive and the ST seems to be no exception. GST are selling a macro assembler for £40 and a compiler for £60. These prices are in line with the same software for the 8-bit machines. This beats £160-odd for the Metacomco screen editor.
5. MAGAZINES. A big thank-you to the magazines who have accepted ATARI articles and especially to those 100% ATARI magazines who have helped owners through thick and thin.
6. DEALERS. During the boom time for computers it seemed that almost every high street shop stocked some kind of computer. When the quick profit was no longer to be had, the stock was off-loaded leaving many owners with nowhere to go for software. It is nice to see that some dealers had faith in ATARI and have stayed with it.
7. PRICES. The main complaint about ATARI has been the price of software. Walk into a shop and price the same program for ATARI and Sinclair. The reason for the higher ATARI price was that the original ATARI programs were overpriced and many software houses felt that the market could sustain such prices. However, some UK writers have come up with very good software that they package and sell themselves. You may criticise the packaging and moan about mail order but you will find, in the majority of cases, the programs are well worth the exceptionally low prices asked.
8. 130XE. At last an affordable high memory computer! Five years ago I could have upgraded an ATARI 400 to 256k using a bank select 'RAMDISK' from and American firm called The Memory Mill. The cost was unbelievable. Now ATARI are to the fore with a cheap, very powerful machine.
9. YOU. Let's face it, if it wasn't for you sticking with your machine I wouldn't be writing this, so choose this one for yourself.
10. JACK TRAMIEL For making it all happen.

1985

pick their highlights of 1985

Our regular software reviewer, JIM SHORT, naturally chose ten software releases.

At the beginning of the year Atari was in a severe state of decline and new software was pretty thin on the ground. How times change. Atari is now back at the top, or very nearly, and there is now a wealth of software at reasonable prices produced in the U.K. thanks to people like ARIOLASOFT, ACTIVISION, U.S. GOLD and others.

So many good games have been released in the last few months that whittling them down to a 'Top Ten' has been no easy task, however I've sifted through them and come up with what I think are the best games of '85 A couple of them have been available before 1985 on import but I've included them because they have only just been officially released in this country so to recent Atari owners they will be regarded as new games. For what it's worth my ten software greats of '85 are as follows

1 RESCUE ON FRACTALUS Lucasfilm/Activision
2 DROPZONE Arena Graphics/US Gold
3 BOUNTY BOB STRIKES BACK Big 5/US Gold
4 ARCHON Electronic Arts/Ariolasoft
5 OLLIE'S FOLLIES US Gold
6 H.E.R.O. Activision
7 BOULDERDASH First Star/Mirrorsoft
8 DROL Broderbund
9 F-15 STRIKE EAGLE Microprose/US Gold
10 STEALTH Broderbund

What about some views from a professional programmer? As well as contributing regularly to PAGE 6, MATTHEW JONES has written MULTI-VIEWTERM for Miracle technology and is currently working on the 'ultimate' communications package for the ST.

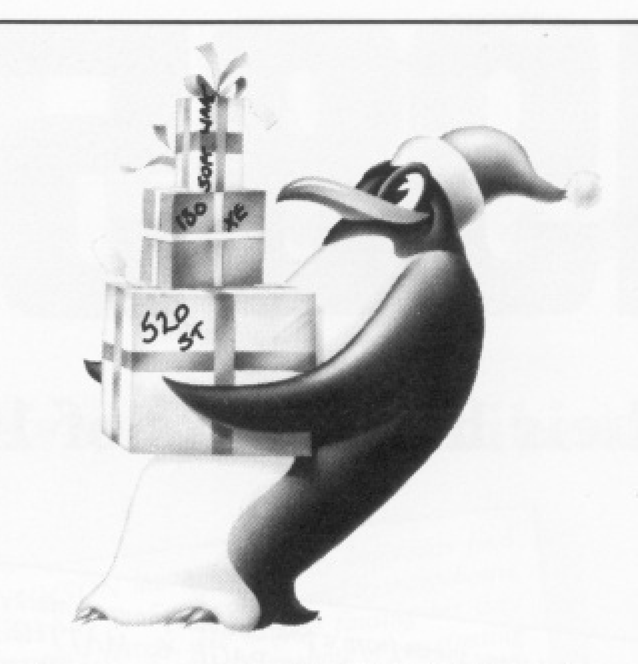
Top ten events of significance? Well these were significant to me and to Atari.

1. MULTI-VIEWTERM hit the streets. Apart from the personal interest I have in it, this marked the end of the age old 'It can do everything except access Prestel' problem. VIEWTERM is the world's first 'proper' Viewdata terminal program - and it's British!
2. The 520ST. Whilst others will probably have mentioned it, I think the most significant release of the ST package was the editor program, weeks after the machine itself, which meant we could actually start typing in some programs!
3. The PCW Show. Not only because of the ST launch, but also because I bought COLOURSPACE (Llamasoft) and spent many nights afterwards 'blowing my mind' with it. It is brilliant!
4. Atari User was launched. While I don't think it is a good as PAGE 6, it does increase the Atari's visibility in the high street.
5. I never realised there was so much in PAGE 6 until it came out on disk. I never quite get round to typing in all those interesting programs (being a professional programmer and writing my own of course...) and even though I was sceptical about the value of a disk subscription, I took the plunge. I am amazed at the quality of the content - and without any typing errors! Well worth it.
6. SpartaDOS. Undoubtedly THE DOS for the Atari, especially XL/XE's. The power of it is incredible, but watch out. I am thinking of buying a 130XE just to get the full benefits of this disk operating system. 1050 owners can buy the U.S.Doubler and never wait for the disk drive again.
7. BOOTS the chemists used the Atari as a 'point-of-sale' advertiser. Used to promote 'Insignia' toiletries, it shows that the Atari is more than just a games machine to gather dust.
8. The Copyright Amendment Act came into power. Perhaps now pirates (read thieves) will leave (Atari) software alone and the infernal 'but you can't buy software locally' problem will go away.
9. ANTIC released BBCS, the Bulletin Board Construction Set. I bought one direct and it is incredible. By the time you read this, I should be running a new board, ABC. BBCS is going to take over the bulletin board world. This may now be available from Software Express.
10. I thought that at least one of the ten should be for bad news but I can't think of anything specific. What could be better though is the level of support for Atari on the streets. Atari users must support their machine. When others talk of computers, don't shy away because you have an Atari, be proud! We know we have the best machines available, let's tell everyone!

And finally what about the Editor? Having set others the task, I sat down to compose my own ten events (before I received any others) and it has been interesting to see how my thoughts compare with other contributors. So....

1. 520ST. To be honest I was a little dubious about its value to anyone who already had an ATARI 8-bit system. When I got one, all doubts were cast aside. Some of the software, even in demo form, far outclasses anything you've seen before and nobody really knows the machine well yet!
2. 260ST. It hasn't even appeared yet but I believe it is crucial to the survival of many of the software houses who have committed themselves to the ST. £750 is cheap for business, expensive for entertainment and a lower price model will convert many more.
3. PCW 85. The first show in years to make non-committed users and companies aware of what ATARI is (and has always been) about.
4. ATARI MARKETING. They must have done one hell of a job to persuade so many companies to write for the ST but, as usual, they didn't tell anybody about it so, yet again, we all though they were doing nothing.
5. ATARI USER. Significant and a brave gamble. Atari finally realised (as PAGE 6 passed its third birthday) that there really is a benefit in having a dedicated magazine.
6. COLOURSPACE. Perhaps the first original concept since the first five ideas were copied time and again. Perhaps Llamasoft will think further ahead and put it on disk.
7. PAGE 6's THIRD BIRTHDAY. Passed virtually unnoticed with issue 18. No party, no cards let's save them for our TENTH birthday!
8. PAGE 6 CONTRIBUTORS. Without whom you would have nothing to read. Thanks for all the quality work and programs and thanks for not deserting us. I have worked hard to make PAGE 6 a magazine where people can feel proud to have their articles and programs published and where writing from the heart beats writing for a job.
9. ANTIC'S WORLDWIDE USERS NETWORK. A laudable idea but included as the 'bad' event of the year. Virtually every newsletter in the States now syndicates their material thus stifling originality and making the latest 'news' from the States seem boring after reading it for the third time.
10. THE COPYRIGHT AMENDMENT ACT. I said in the last editorial that I would not bore you further so you all know why.

Bug club call



A

HAPPY CHRISTMAS

and

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to all **ATARI USERS**

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STARKIE'S UTILITIES

by Andrew Starkie

Here is a useful routine that you may wish to include in your own programs. No explanation is given as it is intended for users who are already familiar with Basic and who can include these segments as subroutines in their own programs.The routine is called YNKEY and will scan the keyboard for 'Y' or 'N' key presses. All other keys are disabled.

I hope that you find this routine useful to enhance your own programs.

```
IF 10 REM ###################################
WV 20 REM CALL SUBROUTINE FOR Y/N INPUT
XB 30 REM YN=USR(ADR(ML5$))
ZW 40 REM IF YN THEN YES
LN 50 REM IF NOT YN THEN NO
IK 60 REM ###################################
OT 70 GOSUB 200
OF 100 REM DEMO
CY 110 ? "PRESS A KEY"
HB 120 YN=USR(ADR(ML5$))
KV 150 IF YN THEN ? "YES"
PZ 160 IF  NOT YN THEN ? "NO"
PW 170 POKE 764,255:GOTO 110
KO 200 DIM ML5$(32):FOR I=1 TO 32:READ A:
   ML5$(I,I)=CHR$(A):NEXT I:RETURN
FM 210 DATA 104,169,0,133,213,173,252,2,2
   01,43,208,8,169,1,133,212,32,226,246,9
   6,201,35,208,237,169,0
UX 220 DATA 133,212,32,226,246,96
```

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